THE

AMERICAN GAS-LIGHT JOURNAL

DEVOTED TO

LIGHT, WATER-SUPPLY, AND SEWERAGE.

Iron Buildings, Nos. 254 & 256 Canal Street, East, near Broadway, New York.

FIRST YEAR.—No. 12. NEW-YORK, FRIDAY, JUNE 1, 1860. $3 PER ANNUM.

TO GAS-FITTERS & PLUMBERS.—L. Waefeler & Co., No. 94 Beekman street, New York, have always on hand several hundred kegs WROUGHT-IRON GAS-PIPE HOOKS, of all sizes from ⅛ to 2 inches. They are made of best quality horse-shoe nail iron, and warranted not to break. Also, PLUMBERS' MATERIALS, such as China Wash-Basins, Closet-Basins, Pan-Closets, Bath Tubs, Boilers, Brass and Silve-plated Cocks, Brass and Iron Pumps, Hydraulic Rams, French Fountain Jets, &c., all at the very lowest prices.

TO INVENTORS.—Patent Agency of the AMERICAN GAS-LIGHT JOURNAL.—The Proprietor of the AMERICAN GAS-LIGHT JOURNAL, is happy to announce that a

PATENT DEPARTMENT

Is now connected with these ROOMS, under the charge of

MR. F. C. TREADWELL, JR.,

Well known as one of the most prompt, reliable, and able Patent Agents and Experts in the United States.

Patents taken out in this County, and in GREAT BRITAIN, FRANCE, BELGIUM, and All Other Countries where Patent Laws are in force.

Re-Issues, Rejected Applications, Interference Cases, attended to with the utmost personal care, and with Mr. TREADWELL'S long experience in them, the interests of Patentees will be unusually secure.

Inventors are cordially invited to visit the ROOMS of the AMERICAN GAS-LIGHT JOURNAL, Iron Buildings, No. 254 Canal street, East, near Broadway, New York. JOHN B. MURRAY, Proprietor.

CLAY RETORTS.—J. K. BRICK & Co.—Brooklyn Clay Retort and Fire-Brick Works Van Dyke, near Van Brunt street, Brooklyn, N. Y.—Manufacturers of Clay Retorts, Fire Brick, Gas and Hot House Tiles, Arch, Furnace and Cupola Brick, Fire Cement, Mortar, &c.

J. K. B & Co. would invite the attention of Gas Companies to the important fact, that the Clay Retorts manufactured at their Works can be set without Tiles, requiring to be supported only at the front and rear ends, thereby exposing the entire surface of the Retort to the direct action of the flame from the furnace.

The results of this mode of setting, are a Saving of Fuel, Tiles, Transportation of Materials, Labor and Space, thereby enabling Gas Companies to set Retorts of at least 50 per cent. greater capacity than those usually employed in the ordinary arches.

FELLOWS, HOFFMAN & CO., (late Starr, Fellows & Co.,) Manufacturers of Gas Fixtures and Chandeliers, Solar, Camphene and Fluid Lamps, Girandoles, Hall Lanterns, &c, No 74 Beekman st., New York.

JOHN COX & CO., No. 696 Broadway, cor. of Fourth street, New York. Importers of French and English Gas Fixtures of every description, Paris Clocks, Real Bronzes, &c. Manufacturers of Silver Ware.

GAS FIXTURES TO BE SOLD at Wholesale Prices.—In consequence of alterations in his store, the Subscriber is obliged to dispose of his entire stock of Gas Fixtures. Those wishing to purchase at very low prices will do well to call. Gas Fixtures removed. Gas fitting executed in all its branches.

J. H. VAN REED 219 Bleecker St.

BUTLER'S PATENT PORTABLE Gas-Works are designed for Dwellings, Churches, Factories and Country Villages, as well as for large consumers in cities. They make gas from CRUDE ROSIN, and are WARRANTED to make as rich an article, at less than ONE HALF the cost of that made by the old method in Portable Gas-Works, and at one-third the average price of Coal-Gas as sold in cities. Great savings in expense of light GUARANTEED to large consumers.

Works of all sizes furnished to suit applicants. Mains, Service and Distributing Pipes put in. Also, a large assortment of Gas-Chandeliers and other fixtures, always on hand, at the lowest prices.

The MANSION HOUSE, BROOKLYN with 280 burners in constant use, make their own gas with my apparatus, with results as stated above. This, (with a small one at my store,) can be seen in operation by application at my office, where descriptive pamphlets, with the names of numbers who are using them, will be furnished.

JOHN BUTLER,
Nos. 112 Fulton & 15 Henry-st., Brooklyn, N.Y.

CORNELIUS & BAKER,

MANUFACTURERS OF

Lamps, Chandeliers, Gas-Fixtures, &c.,

MANUFACTORIES,

821 Cherry-St., and Fifth-St. and Columbia Avenue.

STORE, 710 CHESTNUT STREET,

PHILADELPHIA.

BUTTS & KENDALL, (Formerly F. Butts & Co.,) Dealers in STERLING COAL, Cleveland, Ohio.—The attention of Gas Companies is called to the following letters as to the merits of the above Coal, being a few of the many we have received, and from which we are led to believe that there is no English or American Coal which combines all the qualities desired in a Gas Coal as perfectly as the Sterling:—

Office of the Manhattan Gas Light Co.,
New York, January 13, 1860.

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—Your's of 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactorily—averaging 9520 cubic feet of 15 candle Gas per ton of 2240 lbs., and 41 bushels of Coke, weighing 1465 lbs. We consider it among the best of American Gas Coals, for the quantity and quality of the Gas produced, and also for the excellent quality of its Coke. I am, Gentlemen, your obedient servant, CHARLES ROOME, Pres.

Office of the Rondout and Kingston Gas Light Co., Rondout,
January 4, 1860.

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—The 600 tons of Sterling Coal ordered from you in August, 1859, has now been in use over four months, to my entire satisfaction. Its average yield is 4, 40-100 feet, and a good strong light. The Coke produced equal in quality and quantity, to best English Coking Coals. It burns very freely with little clinker. In purification it is economical, using no more lime than New Pelton. It is superior to any American Coal I ever used. I shall be pleased to give you any further information at my office in New York.

WM. W. HAGUE, 522 Broadway.

The Cleveland Gas Light and Coke Co.,
Office, 195 *Superior-St., Cleveland, Dec.* 30, 1859.

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—This Company has used between 3000 and 4000 tons of your "Sterling Coal," and are still using it with very satisfactory results. We find the average product of a ton of 2000 lbs. is about 8800 feet of Gas and about 37 bushels of Coke. The Gas is of good illuminating power and quite free from sulphur or other impurities, one bushel of lime purifying 9000 feet, and the Coke of very superior quality. The yield of Gas is about the same as from the Pittsburgh Coal, and the Coke better adapted to our use. Yours, truly, T DWIGHT ELLS, Sec.

Office of the Sandusky, O., Gas Co., *Jan.* 16, 1860

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—This Company has used your Sterling Coal since (July 3d, 1859, and are still continuing the use of it with satisfaction to the Company and consumers. The average product has been 8,629 feet of Gas per ton of 2,000 lbs, and 37 bushels of Coke of very superior quality. The Gas is as good as that obtained from Pittsburgh Coal. I consider it the best Coal ever used in our works. I am, gentlemen, yours respectfully, WM HUDSON, Sup't & Sec'y.

We would also refer to Gas Companies in the following places:—New York City (Manhattan and New York Co's), Albany, Troy, West Troy, Rochester, Oswego, Rondout, Kingston, Albion, Brockport, Seneca Falls, Elmira and Lyons, in the State of New York; Cleveland, Toledo, Sandusky, Norwalk and Oberlin, in Ohio; Detroit, Ann Arbor, Grand Rapids and Kalamazoo, in Michigan; Coburg, in Canada, and two Companies in Milwaukie, Wisconsin.

The extensive Mines of the Sterling Coal and Mining Company, in the western part of Pennsylvania (known as the Sterling Hills, and the high est in that part of the State), are wholly under our control, and the Coal is mined and sold only by us or our Agents. The average product of the Sterling Coal, per ton of 2,200 lbs., is 8,733 feet of 15¼ candle Gas (4, 37-100 per lb.), and 37 bushels of Coke of very superior quality. Getting our Coal to this place by railroad, a supply can be had during the summer months (as well as at all other times), which is not the case with coals dependent upon high water for transportation, as are most or all other gas coals which are sent to the Lake ports for shipment. Our manufacturing facilities are such, that we are prepared to ship extensively. For any further information address the undersigned, or M. BALLARD, Esq., Syracuse, N. Y., who is our Agent for that State.

BUTTS & KENDALL, Cleveland, O.

JOHN HEARN & CO., Dealers and Miners in AMERICAN GAS-COALS, Erie, Penn., would call the attention of Gas Companies to the superior quality of our Coals. For the past ten years they have been used by a majority of the Gas Companies in the State of New York, west of Albany and Troy. And also by the Gas Companies in the cities and towns of the North-Western States, and, during the past year, by the East Troy Gas-Light Company, Albany Gas-Light Co., and Manhattan Gas Light Co. of the city of New-York, —all of which heretofore used English Coals.

Owning our mines and a fleet of vessels on the Lakes, having no Railroad transportation, and only 70 miles of canal from this city, or 140 miles of canal and Lake from Buffalo to the coal fields, being 175 miles less of transportation for Coal to the Seaboard, than any Coal Depot on the Lakes, and having an Agency in Buffalo for the transhipment of our Coals only, it is unnecessary to say that parties purchasing of us, will get their Coal at first hand saving, thereby, commission to managers and 175 miles of extra railroad and lake transportation.

A working average of our Beaver Coal is 9,500 feet of 16 Candle Gas, and 40 bushels Coal to the ton of 2,240 lbs.

The Manhattan Gas-Light Co of New York having thoroughly tested the Gas Coals of Pennsylvania and Ohio, the following extract from a letter to us will speak for itself:

"MANHATTAN GAS-LIGHT COMPANY,
"New York, June 15th, 1859.

"MESSRS. JOHN HEARN & CO., Erie, Penn.:

"GENTLEMEN.—This Company has a contract with your firm for the delivery of five thousand tons of Gas Coal, half each Beaver and Mount Carbon, at $ —— per ton of 2,240 lbs.

"The cargo which has been received is satisfactory, and as we shall need 15 or 20 thousand tons more, to be delivered through the present summer, we beg you to advise us whether you desire to increase your contract." We have applications from various parties who desire to supply the Company, but shall be satisfied to get a larger quantity of your Coals, provided you can serve us on terms equally favorable with others.

"For the Gas Co.
"HENRY YOUNG."

We are prepared to contract for the delivery of our Coals in the City of New York, or the cities and towns on the Hudson River.

PITTSBURG GAS-COAL.—The Duquesne Coal Company, whose Mines are located eight miles from Pittsburg, on the Pennsylvania Railroad, are now ready to fill orders for the above well known Coal. Address the Proprietors, J. G. MACFARLANE & Co., at their Coal Office, No. 675 Liberty-st. Pittsburg, Pa.

BURTIS' PATENT COMPENSATING COUNTERBALANCE FOR GASOMETERS.—This Improvement consists in making the attachment to the Gas-Holder by counterweights in such a manner as to effectually prevent it from getting out of level so as to bind, and also to prevent any escape of Gas at Cup or Hydraulic seal, where the Holder is on the Telescopic plan. Holders that work out of level, are thus evenly balanced, and prevented from binding or lodging against Tank wall and falling down, thereby being rendered unfit for service. Where Holders or sections of Holders cannot be used on account of the above difficulties, this arrangement will remove them, and place the Holder in good working order; moreover, with this attachment, deep tanks are not necessary

BURTIS' COUNTERBALANCE has been in use for three years at the Chicago, Ill., Gas-Works. Its resistance to high winds and snow-drif, is alone sufficient to recommend its general adoption. Address P. J. BURTIS, Engineer Chicago, Ill., Gas-Works.

BEAUMONT'S Metallic Thermometers, Barometers and Steam Gages, for Gas-Light and Water Companies. These instruments are entirely Accurate, Portable, and Reliable. Manufactured and for Sale by

VICTOR BEAUMONT, No. 175 Centre-st., N. Y.

For Engravings, see AMERICAN GAS-LIGHT JOURNAL, for May, 1860, page 221.

E. V. HAUGHWOUT & CO.,
488, 490, & 492 BROADWAY,
Cor. of Broome-St., New York,

Gas-Fitters & Contractors for the Erection of Gas-Works.

Messrs. E. V. HAUGHWOUT & Co. have on hand a most extensive assortment of the newest and most desirable styles of

CHANDELIERS, BRACKETS, LAMP POSTS, AND GAS-FIXTURES OF EVERY DESCRIPTION,

to which they would respectfully call the attention of the public.

☞ Gas-fitting done in the most workmanlike manner, and on reasonable terms.

WATERHOUSE & BOWES, Builders of Gas-Works, Raleigh, N. C.—Gas-Works erected in any part of the United States.

REFERENCES.

J. H. Carson,	Pres't, Charlotte,	N. C. Gas-W'ks.	
D. G. Fowle,	do.	Raleigh	do. do.
J. C. Smythe,	do.	Salisbury	do. do.
Arch. McClean,	do.	Fayetteville	do. do.
Jos. A. Waddell,	do.	Staunton	Va. do.
A. G. Story,	do.	Little Falls	N. Y. do.
G. H. Young,	Prop'r	Waverley	Miss. do.

Wm. Johnston, President of Charlotte & S. C. R. R., Charlotte, N. C., A. B. Wood, Agent Reading Iron Works, 57 Maiden lane, N. Y., Cornelius & Baker, Manufacturers of Gas-fixtures, Philadelphia.

G. B. WATERHOUSE. M. BOWES.

OFFICIAL.

BROOKLYN WATER WORKS,
May 26 1860.

TO PIPE CONTRACTORS.—Offers will be received at the Engineer's Office, until the 8th day of June next, for the following Pipes, Stop-cocks, and Hydrants, more or less subject to the specification of the Engineer:

Six inch	pipe,	class	A,	coated,	406 tons.
Six inch	"	"	B,	" 1,090	"
Eight inch	"	"	A,	" 147	"
Eight inch	"	"	B,	" 191	"
Twelve inch	"	"	A,	" 91	"
Twelve inch	"	"	B,	" 89	"
Branches and other special castings					61 "

50 six inch Stopcocks.
15 eight inch do.
115 Hydrants.

By order of Board of Water Commissioners,
JAMES P. KIRKWOOD, Engineer,
355 Fulton street, Brooklyn.

OFFICIAL.

OFFICE OF REPAIRS AND SUPPLIES,
BROOKLYN, N. Y., Sept. 19th, 1859.

APPLICATION being frequently made to this Department, by the citizens, for repairing Wells and Pumps,

This is to inform the Public, and to save unnecessary trouble, that all such applications must be made to the Alderman of the Ward where the Pump is located, and NOT to this Department, as I have no power or control in the matter, except under his direction. SAMUEL GRAHAM,
Commis'r of Repairs & Supplies.

OFFICIAL.

BROOKLYN WATER DEPARTMENT,
OFFICE, 103 GRAND STREET, BROOKLYN, N. Y.

NOTICE.—The Books are now open to receive orders for introducing water into dwellings, stores and public buildings. All wishing the service pipe introduced should make early application. Office open from 7 A. M. to 8 P. M.

STRATTON & CHAPPEL are licensed to introduce the pipe and do all other work connected with the Plumbing department.

STRATTON & CHAPPEL, Plumbers.

OFFICIAL.

WATER WORKS, COVINGTON, Kentucky.

Sealed Proposals will be received by the City Clerk of Covington, Ky., until the 10 h day of July, 1860, for a grant of the exclusive right to establish and operate Water Works in the City, for the term of twenty-five years; the said city at, and at any time after, the expiration of said time, to have the right to purchase the works, upon six months' notice having been previously given to the grantee of the right herein proposed to be transferred, at a valuation by disinterested parties.

For further particulars address the undersigned.

By order of the City Council.

C. H. MOOAR,
Ch'n of Com. on Internal Imp'ts.
Covington, Ky., April 10th 1860.

J. H. BRUNDAGE & CO.,

38 BURLING SLIP, NEW YORK, DEALERS IN

ROSINS ADAPTED ESPECIALLY TO GASMAKERS' USE.

N. B.—J. H. B. & CO. ARE CONSTANTLY PURCHASERS OF ROSIN-GAS TAR.

Office for the Inspection of Gas Meters,

FOR THE STATE OF NEW YORK.

AGENT FOR

Scammon's Celebrated Gas Apparatus,

FOR EITHER COAL OR ROSIN GAS.

GAS-FIXTURES OF ALL DESCRIPTIONS.

GAS-FITTING.

GEORGE H. KITCHEN & CO.,

561 BROADWAY, NEW YORK.

THE ABOVE CUT REPRESENTS MACKENZIE'S PATENT GAS EXHAUSTER (Force Blast.)

It is offered to Gas Companies as a most perfect Machine. They are made of various sizes, capable of exhausting from 5,000 to 150,000 cubic feet per hour.

They require less power, work smoothly, are not so liable to get out of order, and cost much less than the imported ones.

Gas companies intending to use an exhauster, by stating the quantity of gas they may wish to have pass through per hour, will be furnished with a statement of the proper size, and the price of the same, on application to ADDISON SMITH, Manufacturer, New Haven, Conn., or to Messrs. ELLIMAN BROTHERS, New York.

The manufacturer has the liberty to refer to the Albany, N. Y., Gas Light Co., where one has been in constant operation for many months. Another one, capable of exhausting from 50,000 to 70,000 cubic feet per hour, will be in operation in a few weeks, at the St. Louis Mo., Gas Works.

WILLIAM ROY,

93 Beaver Street.

NEW YORK, IMPORTER OF THE CELEBRATED PERCETON FIRE-CLAY RETORTS the quality of which is superior to any other clay yet discovered. Analysis as under :

Silica	62.5	Magnesia	0.3
Alumina	35.0	Prox. of Manganese	0.2
Prox. of Iron	0.9	Phos. of Iron	0.5
Lime	0.6		

VITRIFIED FIRE-CLAY PIPES, from 2-inch to 36-inch, diameter, in lengths of two or three feet ; are indestructible, and not affected by gases or acids.

Thomas Edington & Son's PATENT CAST-IRON PIPES are cast vertically to any weight required. They can also be coated with Dr Smith's Solution, which prevents corrosion ; adapted for gas and water. Made in lengths of nine and twelve feet, or turned and bored joints.

WROUGHT IRON TUBES and all materials for gas and water works Fire-Bricks, Fire-Clay, Water Hydrants, Scotch and English Canne Coal, &c. Kennedy's Water Meters for measuring the flow of water—indispensable to all water companies.

FRINK'S GAS-LIGHT REFLECTORS

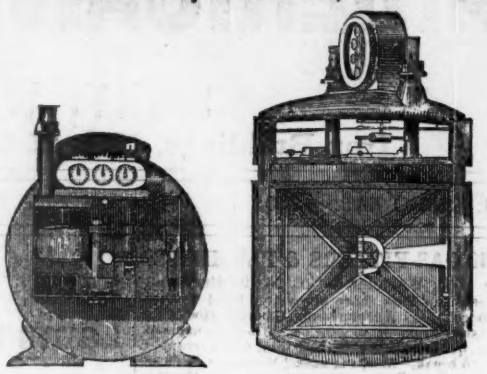
FOR SHOW WINDOWS, BILLIARD TABLES, Desks, Churches, Halls, &c.

Frink's improved Day-Light Reflectors for obviating the use of Gas entirely in the day-time. Frink's Gas-Light Reflecting Shades for Banks, Offices, Parlors, &c. Frink's Concave Gas-Light Reflectors. No. 68 Barclay street, near Greenwich street, New York.

HARRIS & BROTHER'S

Improved Dry Gas-Meter,

Patented May 17th and 31st, 1859.



HARRIS & BROTHER,

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS-METERS AND GAS-APPARATUS,

No. 1117 Cherry St., Philadelphia.

CANNEL and COAL

OF THE BEST DESCRIPTIONS

FOR MAKING GAS AND COKE.

ANALYSES OF CANNEL,

Showing, from the most recent tests, the productive power (in volume) of each kind of material.

	GAS. Per ton, 2240 lbs. In Cubic Feet. At 60° temperature.	COKE. Per ton, 2240 lbs. Cwt.	Qrs.	Lbs.	Quality of Coke.	Ammonia Water in Gallons.	Tar in Gallons.	Illuminating power * per burner consuming 5 feet Gas per hour.	Price per ton free on board vessels in Liverpool	Price at $4.80 per £ sterling.
1	11 700	13	2	7	ood.	16	19	22.50	17s.	$4.08
2	11,000	13	1	16	"	18	16¼	21.25	15s. 6d.	3.72
3	10,000	11	2	0	Inferior.	25	15¼	20.00	14s.	3 36

ANALYSES OF COAL.

No.	GAS Per ton, 2240 lbs In Cubic Feet.	COKE. Per ton, 2240 lbs. Cwt.	Qrs.	Lbs.	Quality of Coke.	Ammonia Water in Gallons.	Tar in Gallons.	Illuminating power * per burner consuming 5 feet Gas per hour.	Price per ton free on board vessels in Liverpool.	Price at $4.80 per £ sterling.
1	11,000	13	1	16	Good.	16	11¼	14.00	11s. 6d.	$2.76
2	9,690	13	3	0	"	27	10	10.40	9s. 6d.	2.28
3	9,800	13	2	0	"	24	12	9.80	8s. 6d.	2.04

* Equal to Spermacetti Candles, burning 120 grs. per hour.

The above analyses embrace the best Cannel and Coal raised in the Lancashire, &c., districts, and are tabulated, for safety, rather below the average results. They are large, well screened, and free from dirt when delivered on board vessels, and are used for gas purposes at the chief gas works in England and on the Continent.

Orders for less than 50 tons, (*i. e.*, a boat load,) will be charged the cost of carting, viz., 1s. 6d. per ton.

The prices quoted will in all cases be subject to such alterations, more or less, as the case may be, as may arise in the market between the issue of this offer and the time at which the order may come to hand.

TERMS:—Cash, on presentation of the bills of lading at your bankers or agents in Liverpool, or as may be otherwise arranged, less 2½ per cent. discount

Also, HAND PICKED CANNEL and COAL, for house use.

Concessions in prices made for large quantities.

GAS APPARATUS of all descriptions and on the most approved principles. Also, Purifying and other materials supplied.

ANALYSES, PLANS, and ESTIMATES, and other information required, and the highest references, furnished on application.

Contracts for materials and works entered into. No charge made for superintending shipments, preparing bills of lading, or passing entries.

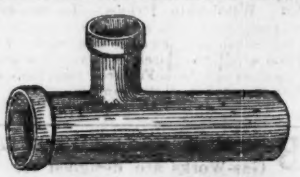
EMANUEL TURNER & CO.,

Export Offices, 34 Castle street, Liverpool, England.

GAS, STEAM, SMOKE, PURE WATER AND SOIL PIPE,

CLAY RETORTS, TILES, BRICKS,

AND EVERY VARIETY OF FIRE GOODS.



JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS,

Near Leeds, England.

T. W. PARMELE, Agent, No. 4 Irving Place, New York.

CELLULAR GAS RETORTS. C. M. CRESSON'S CELLULAR GAS Retorts, Patented October 3d, 1854. Adapted to the manufacture of GAS from Rosin, Coal, Wood, &c., and now in use at the Philadelphia Gas Works. Patent Rights for sale. For information apply to HENRY S. HAGERT, Attorney for Patentee, S. E. cor. of Walnut and Sixth streets, Philadelphia, Pa.

ALFRED F. JAMES, Collection, Exchange and Land Agency, Galveston, Texas.

REFERENCE—John B. Murray, New York.

R. D. WOOD & CO., Manufacturers of Cast Iron, Gas and WATER PIPE ; RETORTS, LAMP-POSTS, &c. S. W. corner 4th and Chesnut streets, Philadelphia. Works at Millville, N. J.

LOCKE & CRAIGIE, Plumbers and Gas-Fitters, No. 12 East 20th street, New York.

LOCKE, CRAIGIE & CO., Gas-Fittings, Chandeliers, Brackets, Globes, &c., No. 927 Broadway, New York.

☞ Particular attention paid to country work.

MORRIS, TASKER & CO., PASCAL IRON WORKS,

[ESTABLISHED 1821]

PHILADELPHIA, manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap Welded Boiler Flues,

GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast Iron, screwed together, flush inside and out ; Gas-works Castings, Retorts and Bench Castings for Coal gas works ; Cast Iron Street Mains, Bends, Branches, Drips, &c.

GAS AND STEAM FITTERS' TOOLS, &c.

STEPHEN MORRIS, CHAS. WHEELER,
THOMAS S. TASKER, STEPHEN P. M. TASKER.

MANHATTAN SAVINGS INSTITUTION, No. 644 Broadway, New York. Assets, January 1st, 1859, $1,183,600 98. Open daily from 9 A.M., to 7 P.M.

A. A. ALVORD, Secy. E. J. BROWN, Prest.

D. APPLETON & CO., Importers and Dealers in American and Foreign Books, publishers of Appleton's Railway Guide and of Appleton's Dictionary of Mechanics—a work indispensable to all engaged in the manufacture of Gas. 346 Broadway, New York.

MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS METERS.

MANUFACTORIES

SUFFOLK ST. CLERKENWELL GREEN. & ALLEN ST. GOSWELL ST. LONDON.

THOMAS GLOVER introduced his PATENT DRY GAS METERS into the United States and Canadas in 1846, and since that time he has received extensive patronage from many Gas Companies of those countries as well as from this. Thomas Glover confines his sole attention to the business of Gas-Meter making. The propriety of his doing so is satisfactorily proved by his success. For example: one London Company has now in use above 12,500 of his Patent Dry Gas-Meters, and some of these Meters have been fixed for fourteen years and are still in working order, without complaint from either the company or the consumer.

THOMAS GLOVER thinks it necessary to put Gas Companies on their guard against parties selling Patent Dry Gas-Meters constructed in imitation of his, but unskilfully made on erroneous principles, and with improper and unsuitable materials.

THOMAS GLOVER'S Workshops are now the most extensive in this or any other country, and he is thereby enabled promptly to execute orders to any extent required. Purchasers may, at any time, inspect his Works and the materials of which his Meters are constructed.

Suffolk Street, Clerkenwell, London, and 1 Barrett Street, Fulton Street, Boston.

JOSEPH LENNIG & CO.,

Nos. 313 and 315 NEW MARKET STREET, above Vine street,

Philadelphia, Pa.,

Invite particular attention to their

Patent Excelsior

ROTARY VALVE,

And Patent

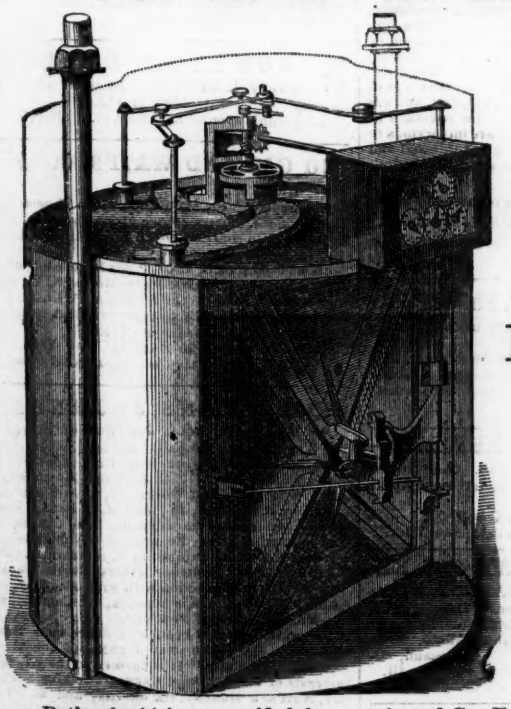
INLET CONDENSING CHAMBER

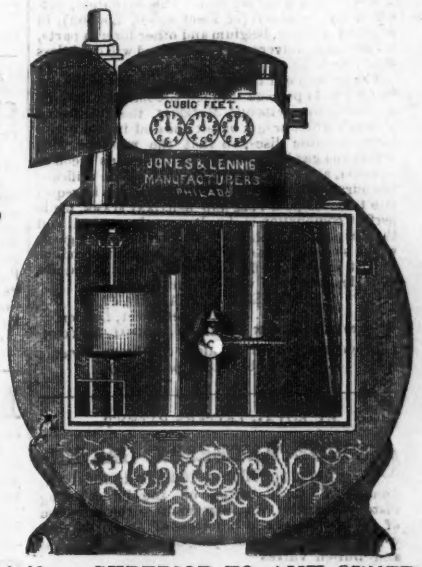
DRY GAS-METER,

And to their

UNSURPASSED

WET GAS-METER.





Both of which are certified, by experienced Gas-Engineers, Builders and Superintendents of Gas works to be equal, if not SUPERIOR TO ANY OTHER METERS MADE.

An impartial trial and examination will *convince* every *intelligent* and *unprejudiced* mind of the *vast superiority*, not only of their *utility*, but also of their *Workmanship* and *Materials*. The materials used in their construction are *unsurpassed* in quality, and *undoubted* satisfaction is *guaranteed* to all purchasers.

Our Manufactory is now one of the *most extensive* in this Country, and we are thereby enabled promptly to execute orders to *any extent required*.

Our Meters speak for themselves, and we *caution* Engineers and Gas Companies against believing or being misled by *libelous circulars*. *Gas Officers are too intelligent to be deceived by such a series of misrepresentations.* We challenge superiority in both our Wet and Dry Meters.

SAMUEL DOWN,

Nos. 340, 342, 344 and 346 West Twenty-second Street, North River, NEW YORK CITY,

MANUFACTURER OF

WET AND DRY PATENT GAS METERS,

Pressure-Registers, Pressure-Indicators and Gauges, Station, Show, Customer, and Experimental Gas-Meters, Centre or Hydraulic Valves, Governors, Compensators for Exhausters, and the Standard Testing Gas-Holders* for Proving Meters, now used in the State of New York in compliance with an Act of the Legislature. Also, Bunsen's Photometer, with complete Apparatus for working the same.

*The standard of measurement of this Gas-Holder is given by Professors TORREY, of the U. S. Assay Office; JOY, of Columbia College; GIBBS, of the Free Academy and several other distinguished scientific gentlemen.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE, ENGLAND,
Manufacturer of CLAY RETORTS, FIRE BRICKS, and every description of FIRE CLAY GOODS.

TO GAS-COMPANIES, ENGINEERS, Merchants, Gas-Fitters, Surgical Instrument Makers, &c.

FLEXIBLE GAS FITTINGS.

The existing great demand for Hancock's ENAMELLED or GLAZED FLEXIBLE TUBING, and the increased facilities of manufacturing it is an assurance of the satisfaction experienced by the public in the use of this article, so extensively made by JAMES LYNE HANCOCK, OF LONDON, who begs now to announce to the trade, that he continues to export, to a large extent, FLEXIBLE GLAZED TUBING for GAS, Surgical and other instruments, now in such general use amongst Gas Companies, Engineers, Gas-fitters and others.

This is the only TUBING that perfectly resists the action of coal gas. It is made of all sizes, from ⅛ inch up to 1¼ inches, and in 60 feet lengths. The measure is always external diameter, to connect the usual metal fittings.

SOLID VULCANIZED INDIA RUBBER TUBING, for GAS, WATER, &c., made of all sizes, and in 60 feet lengths, either with or without spiral wire inside.

For price lists and any other information, apply to JAMES LYNE HANCOCK, VULCANIZED India Rubber Works, 8 Goswell Road (opposite Spencer street), LONDON, E. C.

N. B.—Orders by post, with remittance, or good reference in England, will be promptly executed.

MOST IMPORTANT TO ALL Consumers of Gas.

HART'S PATENT GAS-BURNER.

HART'S PATENT ECONOMISING GAS BURNERS have been adopted by thousands of public and private establishments, Gas Companies, for Street Lamps, &c., &c., in various parts of Europe, after proving the utter WORTHLESSNESS of GAS REGULATORS and other inventions ALLEGING to produce a MAXIMUM amount of light with a MINIMUM amount of gas, and are considered by all who have given them a trial to be the most economical—effecting a positive saving of from 5 to 35 per cent.—and the only means capable of producing a WHITE, THIN AND PURE FLAME of such brilliancy as was never before obtained from gas by whatever means consumed, as proved by photometrical tests made with the most improved instruments by Bunsen, Wheatstone, King, and Wright, *the superior light varying in degree from 5 to 100 per cent.* This invention, patented by Mr. HART (of Fleet street, London), in England, France, Belgium and other foreign parts, is now being universally adopted, and will doubtless continue to be so long as gas is used.

The principle of the invention consists in the gas being (in its passage through the burner) resisted primarily by a FIBROUS MATERIAL, thence passing through a diaphragm of felt encased in two perforated metallic discs, so that the pressure with which the gas is supplied from the mains becomes checked, and permits the gas to reach the orifice of the burner with only such velocity as may be requisite to develope a FULL AND BRILLIANT FLAME while perfect combustion is simultaneously secured, and thus is prevented the escape of unconsumed gases which so deteriorate the atmosphere as to produce a most injurious effect upon the health, and are alike destructive of works of art.

HERBERT WILLIAM HART,
69 Fleet street, London.
Or care of AMERICAN GAS-LIGHT JOURNAL, N. YORK.
(For engravings see AMERICAN GAS LIGHT JOURNAL for December, 1859, page 100.)

BY ROYAL LETTERS PATENT.

GEORGE ANDERSON, GAS ENGINEERING OFFICES. 104 Leadenhall st., London, E. C., Patentee of the Direct acting Piston Exhauster, &c., begs to draw the attention of the Engineers and Managers of American Gas-works to his Patent Purifying Changing or By-pass and Shut-off Valves.

COWEN'S PATENT FIRE-CLAY Retorts.

JOSEPH COWEN & Co., Blaydon Burn, near Newcastle-on-Tyne, England, were the only parties to whom a Prize Medal was awarded at the Great Exhibition in London, of 1851, for "GAS RETORTS AND OTHER OBJECTS IN FIRE CLAY."

J. C. & Co. have been for many years the most extensive manufacturers of Fire Clay Retorts in the United Kingdom; and orders for FIRE CLAY RETORTS of all shapes and dimensions, FIRE BRICKS, and every other article in Fire Clay, are promptly executed at their works as above.

COWEN'S GARESFIELD COAL AND COKE.
Coal and Coke office,
QUAY SIDE, NEWCASTLE ON TYNE.

WILLIAM RYDER.
General Mineral and Metal Agent and Merchant, 4 Dean street, NEWCASTLE-ON-TYNE, England, is prepared to supply Gas Companies and others with every variety of appliance for the production and supply of Gas, including GASOMETERS, RETORTS (metal and clay), FIRE BRICKS, COALS, METAL MAINS, TUBES, in wrought iron, copper, brass, lead or composition, METERS, TAPS, FITTINGS, &c., &c; and from his extensive experience in this class of work, can guarantee every thing of the best description.

BERGEN IRON WORKS.
Established 1833.
R. A. BRICK, Manufacturer of CAST-IRON WATER and GAS PIPES. RETORTS, PIPES, &c., always on hand, Office 109, Leonard street, New York.

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Cast Iron Soil and Drain Pipe, Tees, Bends &c.
A. & E. B. BRADY.

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AUGUSTUS VIELE, Manufacturer of Gas and Water Pipes of all sizes. DRIPS, SYPHONS, BENDS, AND BRANCHES. The manufactures of this establishment are in use in various Gas and Water Works throughout the country.
Address AUGUSTUS VIELE, West Troy, N. Y.

HOPE IRON FOUNDRY,
PROVIDENCE, R. I.
Gas-Work Castings of every description.
They would call attention to their superior IRON RETORTS, which are extensively used with good satisfaction; also to E. WALCOTT'S PATENT MOUTH and LID, possessing important advantages over any other in use, and are shown in a circular which can be obtained by addressing—
JOS. P. MANTON, Agt.

EXCELSIOR IRON WORKS.— GEORGE R. JACKSON & Co., (Successors to Cornell & Jackson,) 201 Centre street, cor. of Howard, New York.—Fire-Proof Doors, Vaults, Safes and Shutters, Enameled Grates and Fenders, Iron Railings, for Public Buildings, Dwellings, Balconies, Verandahs, Stair-cases, Parks and Tombs, Prismatic Platforms and Vault Lights, Columns, Girders, and all kinds of Castings for Building purposes.
☞ Casting for the Trade.

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HERRING & FLOYD, proprietors, manufacture Gas Compensators of all sizes, Self-Acting Valves, Exhausters upon an improved plan, costing less than half those of English manufacture, also castings of every description for Gas and Water Works.

Herring & Floyd offer for sale Sabbaton's Patent Screening Shovels for coke and coals, made of malleable iron, of all sizes; Sabbaton's Patent Improved Cast Iron Furnace Frame and Door, arranged to protect the iron work of the door and frame from direct contact with the fire; also Floyd's Patent Malleable Iron Retort Covers, only quarter of an inch thick, but of convex form, and of great strength, as is attested by certificates from several of the leading Gas-works in America. For engravings of all the above patents see AMERICAN GAS LIGHT JOURNAL for October, 1859, pages 65 and 71.

Samples of the above castings can be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

S. V. MERRICK, J. VAUGHAN MERRICK,
W. H. MERRICK.
SOUTHWARK FOUNDRY,
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MERRICK & SONS, Engineers, manufacturers of every description of Gas Machinery.
Retorts, Bench Castings, Condensers, Washers, Scrubbers, Wet or Dry Lime Purifiers, Coke Wagons, Fire Tools, Wrought Iron Grate Bars, Gasholders, either TELESCOPIC OR SINGLE, WITH SUSPENSION FRAMES COMPLETE; Wrought Iron Roof Frames, for Iron or Slate; Stop Cocks, Exhausters, Steam Pumps, Boilers and Tanks, Steam or Hand Air Pumps for proving Street Mains, Centre Seals, Governors, Wrought or Cast-Iron Lime Sieves for Purifiers, Purifier Hoisting Machines, &c., &c.
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Water Closet Pans, Wine Basins, Wash Basins, Sinks, Fountains, Jets for public and private purposes, Stop-cocks, Filters, and all other Water apparatus.
ALSO, a complete assortment of Gas-fixtures, Pendants, Chandeliers, Brackets, &c &c.

THOMAS NICHOLL, Gas and Steam Fitter and Plumber, Nos. 170 and 172 Centre street (next door to N.Y. Gas Co.'s office), New York. Pipes inserted in Churches, Factories and Dwellings; Chandeliers re-gilt.
Jobbing promptly attended to.

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HARPER & O'CONNELL, Manufacturers of Gas Shades and Globes of every description. FRENCH COLORED GAS SHADES AND SMOKE BELLS, Nos. 63 and 65 Elizabeth street, corner Hester, New York.

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117 North Water street, and 124 North wharves, Philadelphia, AGENTS FOR FLORENCE & MERCER FOUNDRIES, ELK STREET IRON WORKS.
CAST IRON STREET MAINS; *Bends, Branches, Chemical Retorts, and all kinds of Castings for* GAS-WORKS, either COAL or ROSIN WORKS. SHEET IRON FOR GASOMETERS *cut and punched to order.* BOILER IRON *of all descriptions.* RUSSIA SHEET IRON, TIN PLATES, BLOCK TIN, COPPER, PIG LEAD, SPELTER, and Metals generally.

GEORGE W. KRAFT, GASOMETER and Boiler-maker, Chestnut st. wharf, West Philadelphia, manufactures Gasometers, Retort House Roofs, Water Tanks Purifying Boxes, Coal Cars, Coke Barrows, and all kinds of Wrought Iron Work for Bridges, Buildings, &c.
Particular attention paid to Alterations and Repairs.
REFERENCES:
John C. Cresson, Engineer Gas Works, Philadelphia; Joseph A. Sabbaton, Engineer Manhattan Gas Works, New York; Col. W. S. Campbell, Engineer Gas Works New Orleans; P. A. Sabbaton, Engineer Gas Works, Albany; Waterhouse and Bowes, Gas Engineers, Raleigh, N. C.; Joseph Battin, Newark, N. J.; C. B. Dungan, Philadela.

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Office 1908 Market street, Philadelphia.

COLWELL & CO., Manufacturers of Pig Iron and Cast Iron Gas and Water Pipes, No. 207 North Water street and 206 North Wharves, Philadelphia.
STEPHEN COLWELL, W. DWIGHT BELL,
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STEPHEN SCAMMON,
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HIGHLY GLAZED FIRE CLAY Pipes, for Sewerage and Water Purposes, Gas Retorts, Fire Bricks, &c WILLIAM McKEAN, 74 Broadway, New York, agent for the "Field-House Fire-Clay Works," Huddersfield, England, is prepared to treat with corporations, Contractors, and Gas Companies, &c., for the supply of the above articles, either in Liverpool, or delivered at any important port on the Atlantic coast, from New Orleans to Montreal. The Field-house Pipes have been used for the sewerage of the principal cities and towns in England, and are now being extensively used for the sewerage of the city of Brooklyn, N. Y. They are impervious to moisture or decay; will stand great internal and external pressure, and are cheaper than either brick or stone sewers
Further information can be obtained by application to WILLIAM McKEAN, 74 Broadway.
Pipe Yard—Furman street, between Joralemon and Atlantic streets, Brooklyn.

JOHN NEWKUMET, Philadelphia Fire-Brick Works, Vine and Twenty-third Streets, Philadelphia.
Manufacturer of all kinds of FIRE-BRICK, GAS-HOUSE TILES, to suit all the different plans in use. Clay Retorts and Dentists' Muffles. Orders filled at short notice.

GAUTIER'S CLAY RETORTS.— Fire and Arch Bricks, Gas-House Tiles, &c. Black Lead Crucibles for Steel Works and Brass Founders.
MANY, BALDWIN & MANY,
49 John st., New York.

PATENT PYRO-CLAY GAS RETORTS. THOMAS HOADLEY, Patentee, wishes to call the attention of Gas-engineers to these Retorts, as a very superior article.
REFERENCES:—Gas-Light Works, Buffalo, N. Y.
" " Cleveland, O.
" " Chicago, Ill.
THOS. HOADLEY, 34 Front st., Cleveland, O.

ENGLISH FIRE BRICKS, Rufford's Stourbridge Bricks, Stourbridge and Welsh Clay.
S. THOMPSON'S Nephew, IMPORTER,
45 Gold street.

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N. B.—Stove and machine patterns of every description, made with elegance and precision.
Metallic letters for patterns always on hand.
No 102 Elm st., cor. Walker st. New York.

STUART & PETERSON,
Willow street, above Thirteenth, Philadelphia, Manufacturers of LAMP POSTS and CAST IRON STREET-LANTERNS.
P. S.—Our Cast Iron Lanterns are warranted to outlast three Tin Lanterns.

I AM PREPARED to furnish, at my Balloon Factory at this place, Balloons complete and ready for service, manageable by ordinarily skillful persons, at reasonable prices. For a Balloon of fine linen, large enough to carry two men, ready to ascend, the price will be $250. Other sizes in proportion. My Balloon Linen is made to my own order in Europe.
List of prices of Balloons, all complete for use.

Feet. Diameter.	Lifting power with coal gas.	Prices.
25	220	$200 00
26	225	210 00
27	290	220 00
28	325	235 00
29	360	250 00
32	500	300 00
40	1020	400 00

At these prices I can furnish good serviceable Balloons, which are easily managed, will make hundreds of ascensions, and which an ordinary person may use with as much success as he can a horse and buggy.
JOHN WISE, Lancaster, Pa.

T. G. ARNOLD, Manufacturer of Gas Burners, Mercury Cups, Portable Sockets, Burner Pillars, &c., No. 447 Broome street (second door west of Broadway), New York. Imported Scotch Tips and Burner Plyers always on hand

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Manufacturer of Patent Porous Gas-Burners for COOKING, IRONING, HEATING, CHEMICAL APPARATUS, &c., No. 772 Eighth Avenue, corner of Fifty-Fourth street, New York.
Samples are on exhibition at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

THE AUBIN GAS-WORKS CO., (No. 44 State street, Albany, N. Y.,) will refer parties wanting GAS-WORKS FOR VILLAGES to seventeen of their Village Works now in operation in the United States and the Canadas in *every one of which the profits of the company are ten per cent. and upwards, and yet good gas is furnished.* Agents wanted to extend the sale of the AUBIN PORTABLE GAS STOVE for dwellings, factories, &c., which will make 1000 feet of gas in five hours, and with greater simplicity, safety and economy, than any other known apparatus.

GASOMETER RIVETS. Every kind of Rivets used in Gasometers. PHILLIPS & ALLEN,
Pennsylvania avenue, above 22d st., Philadelphia

TO GAS AND WATER COMPANIES:
The undersigned, Agent for Messrs. Thomas Edington & Sons, Phenix Foundry, Glasgow, Scotland, is prepared to contract for all descriptions of Cast-iron Pipes of their manufacture.
About 6000 tons of these Pipes have lately been supplied to the Brooklyn Water-works, N. Y., and the Chief Engineer of the Works, A. P. Kirkwood, Esq., is ready to testify to their excellent quality.
ARCHIBALD BAXTER,
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Sole Agent For the United States and Canada

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Subscribers receiving their copies direct from the publishers remit their subscriptions to the office of SILLIMAN'S JOURNAL, NEW HAVEN, CONN.
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All communications, remittances, &c., to be addressed to SILLIMAN & DANA,
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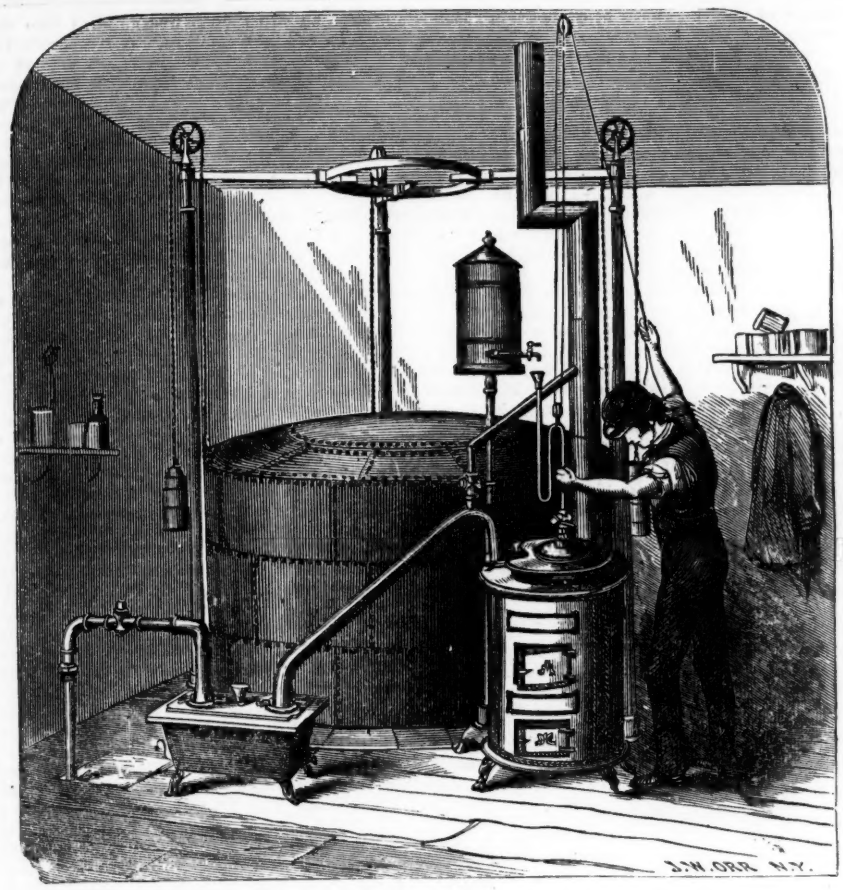
LE JOURNAL DE L'ECLAIRAGE AU GAZ, published in Paris on the 5th and 20th of each month.
American subscriptions are received at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, N. Y.

OFFICIAL.

NEW YORK STATE INSPECTOR of Gas-Meters,; Office 561 Broadway.
Gas-meters proved since May 31, 1859..... 20,459
Number of proving apparatus tested..... 36
NEW YORK, May 31, 1860.
GEORGE H. KITCHEN,
State Inspector.



GAS FOR THE COUNTRY.

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MANUFACTURER OF

Improved Portable Gas-Machines,

FOR

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This Machine has been in successful operation for years, in many of the best residences and factories in the country, and for simplicity of construction, ease of management and economy of light produced, possesses advantages over all other machines for the purpose now in use. It is adapted to the making of gas from Crude Rosin or Rosin Oil—*producing a gas of twice the illuminating power of Coal gas, at about one half the price usually charged for that gas.*

Every machine is sold under a strict guarantee to operate according to representation, and no payment required until the fact is demonstrated by actual use.

For further particulars, and descriptive pamphlet containing references to numerous parties, now using the apparatus address,

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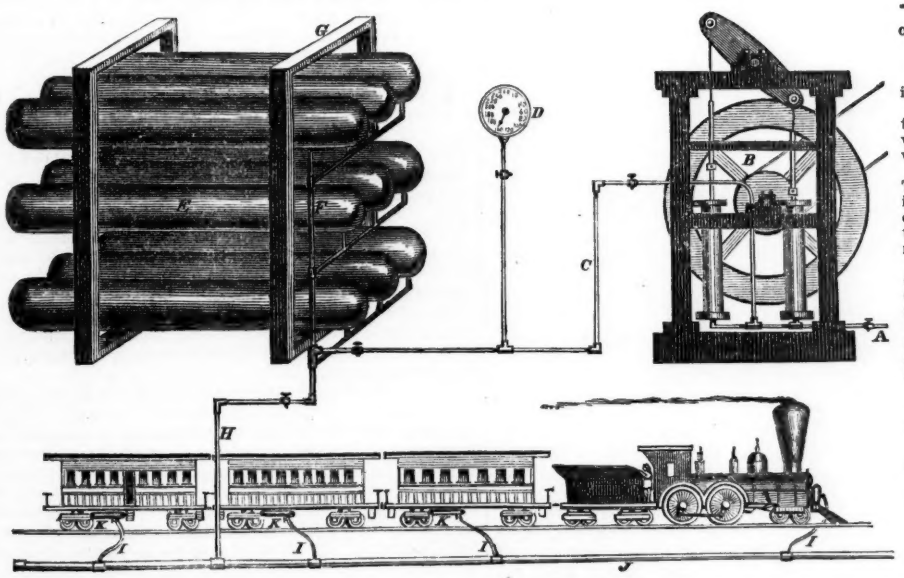
No. 256 CANAL ST., near Broadway,

NEW YORK.

☞ Responsible Agents wanted with whom liberal arrangements will be made.

FOR LIGHTING RAIL-ROAD CARS AND STEAMBOATS WITH GAS.



The annexed cut represents the COMPRESSING APPARATUS; also the process of filling the gas-holders on the cars.

A, the inlet pipe from the main.

B, the force pump.

E, a series of cylinders or gas-holders, connected together by the pipe, F, forming a reservoir of the required size.

D, a gage indicating the amount of compression. The gas is taken in from the street, or from any gasometer through the pipe A, and forced into the reservoir E, through the pipe C, to any degree of compression required. The reservoir E, is filled as needed, to draw off into the holders on the cars.

H is a pipe leading from the reservoir E, to the pipe J, along the Station. The flexible hose I, is attached to holders K, underneath the cars. The faucet in pipe H, is opened, the gas passes from the reservoir into the holders on the cars, filling them instantly. The hose I, is disconnected from the holders K, and the train is ready to leave. The whole process of filling the holders of a train requires but three minutes.

Where the cars can stand on the track for thirty minutes, the gas is passed directly from the pump B, through the pipes C and H, into the holders K, thus doing away with the reservoir E, entirely; this may be done at either end of the road.

This apparatus has been used on the New Jersey railroad nearly two years and for more than a year on the Camden and Amboy R. R., and the Philadelphia and Reading R. R. The Camden and Amboy R. R. Co. have the apparatus on all their cars, and on two of their Ferry Boats.

The uniform flow of gas is secured by a Patent Regulator.

This apparatus is also adapted to Steamboats making trips of not over three or four days in length, and to the head lights of Locomotives.

The apparatus can be seen in operation at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

APPLY TO THE

New York Car and Steamboat Gas Co.,

No. 117 Fulton St., New York.

KENNEDY'S METHOD OF SECURING IRON MOUTH-PIECES TO CLAY RETORTS.

Fig. 1

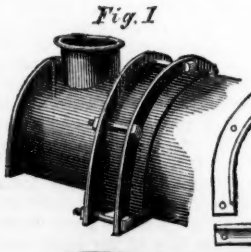


Fig. 3

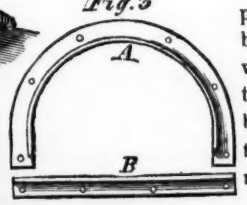


Fig. 2

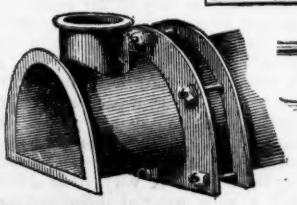
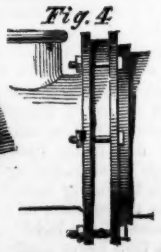


Fig. 4



The Retort is made in the usual form but without any bolt holes through the flange. An iron collar made in two pieces, A and B, Fig. 3, is then placed around the Retort behind the flange, and bolted to the mouth-piece by bolts which pass just outside of the flange, instead of passing through it. As each Retort costs, about $30, and as the breaking-out of the bolt holes entirely ruins the whole Retort, the importance of this simple but valuable improvement will be readily appreciated.

By this improvement the mouth-piece is firmly attached to Clay Retorts in a simple and very substantial manner, the bolts passing from the yoke to the mouth-piece on the outside of the Retort. The yokes are furnished at a low price, ready to be put on.

ADDRESS THE PATENTEE,

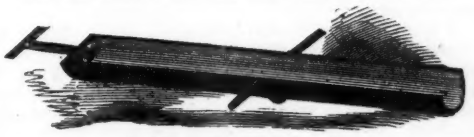
JOHN P. KENNEDY,

Trenton, N. J.

McKINNY & KELLY,

MANUFACTURERS OF

COAL-SCOOPS



Coal-Scoop for filling Retorts.

AND

COKE-BARROWS

Coke-Barrow.

FOR GAS-WORKS.

FURMAN St., Near Fulton Ferry, Brooklyn, N. Y.

Samples are on Exhibition at Rooms of AMERICAN GAS-LIGHT JOURNAL.

ON THE RELATIVE COST OF ILLUMINATION IN LAFAYETTE, IND.

BY CHARLES M. WETHERILL, PH. D., M. D.

[*Continued from page* 231 *of* AMERICAN GAS-LIGHT JOURNAL.]

COAL-OIL EXPERIMENTS.

This oil, yet in the infancy of its manufacture, but destined, no doubt, to play a very important part in the future history of artificial illumination, was made the subject of extensive experiment.

Its introduction into this community about two years ago produced results very unfavorable to itself, by reason of the very inferior quality of the oil in the market. A great many who tried it abandoned it utterly, with useless, and, in some cases, expensive lamps in their hands, and forming prejudices difficult to be overcome. This untoward result was brought about by the short-sightedness of the producers, who, pressed beyond the capacities of their works, issued much oil too far distilled and purified insufficiently. The first consignment of oil generally burned well; all that followed was worthless.

A sample of this kind of oil may be seen in Table I., viz., that of C. Thumm & Co., Pittsburg, sent here in the early part of 1859. This oil, lately tested in a paragon lamp, burned as it did last year, viz., at first with a good light (5·3, C. P.), but which so soon diminished from a crusting and "spitting" wick, and the chimney became so coated with white deposit, that the experiment was abruptly concluded.

These experiments may be classified either by oils or by lamps. I have adopted the former method in Table I., giving a comparison of the lamps in Table II.

sive. But the degree of unpleasantness of coal-oils, in this respect, is essentially a matter of taste and usage. To myself the Chrysoline, Kerosene, and Kentucky oils have an agreeable aromatic odor, while the Pennsylvania oils are not unpleasant, and the odor of coal-gas is extremely disagreeable to me.

A characteristic of all the coal-oils cannot have escaped the observation of any one, viz., the extreme degree to which they possess the beautiful property of fluorescence; the yellow oils, by transmitted light, appearing blue by reflected light, while the brown oils reflect violet. This property gives to the bubbles, which so readily form when the oil is shaken in a bottle, a gorgeous appearance, by which the blue modifies the colors natural to the thin films. The Kentucky oils, and the Chrysoline, present, in lamps, a beautiful golden amber color, the exact tint of Canary (*i. e.* Uranium) glass; but with blue in the place of green reflections, a lens throws a cone of splendid blue light through the oil. This property of coal-oil deserves to be followed more closely, as capable of throwing more light upon the subject of fluorescence. I think that the effect is due to the oil and not to its coloring matter, for the whitest Kerosene, when tested by the lens, exhibits a deep blue cone of rays. If a white glass bottle, containing the lightest Kerosene, be placed in the open window of a moderately dark room in such a manner that the sun shines directly upon it, and is observed from the outside of the window, with the eye below the level of the oil, the top of the liquid appears of a clear sky-blue.

RELATIVE VALUE OF THE OILS.

In the eleventh column of Table I. will be found the mean results of the experiments of Table II. These

TABLE II.

SUMMARY OF COAL-OIL EXPERIMENTS.

Order of Ex.	Oil.	Lamp.	Fl. oz. Consumption in four hours	Star Candle Power		Remarks.
				Begin.	End.	
1	1st bbl. Lucesco.	Knapp.	6·31	11	9	Bad burner.
2	"	Largest Paragon.	7·08	11		In long lamp.
3	"	" "	8·50	11	10·75	" "
4	"	Dietz.	—	14	11	" "
5	"	"	8·63	14	14	In squat lamp.
6	"	Waterbury.	3·64	4·8		Bad burner.
7	"	Drake's Double Wick.	2·95	3·6		" "
8	"	Jones & Merrill.	3·92	5·9		
9	"	" "	3·67	5·3		Same light at 8 & 10 ft. photometric distance.
10	"	" "	"	5·3		
11	"	Small Paragon.	3·92	5·5		
12	"	" "	3·67	5·3		
13	"	" "	"	"		
14	"	" "	3·79	"		
15	"	" "	3·78	"		
16	"	Excelsior.	4·07	5·9	5·9	
17	2d bbl. Lucesco.	"	3·46	5·3	4·8	
18	"	"	3·74	"	2·8	
19	"	Jones & Merrill.	3·78	"	4·8	
20	Adair & Veeder.	Excelsior.	3·76	5·3	5·3	
21	" "	Small Paragon.	3·9	"	"	
22	1st bbl. Austen Kerosene.	Large Paragon.	—	11		In long lamp.
23	" "	" "	7·42	11	6·5	" "
24	" "	" "	7·69	11	8	" "
25	" "	Dietz.	—	14		Agent's squat lamp and oil.
26	" "	Jones & Merrill.	3·89	5·3	4·8	
27	" "	Paragon.	"	"	5·3	
28	2d Kerosene.	Excelsior.	3·86	6·2	5·1	
29	"	Jones & Merrill.	3·58	5·3	4·0	
30	1st bbl. Cloverport.	Large Paragon.	8·60	11·0	9·0	In long lamp.
31	" "	Jones & Merrill.	3·50	5·3	4·8	
32	" "	" "	3·79	"	"	
33	2d Cloverport.	" "	3·45	5·0	4·8	
34	"	Paragon.	3·55	5·3	5·3	
35	"	Excelsior.	3·90	5·9	5·9	
36	"	"	3·66	5·9	5·5	
37	Maysville.	Paragon.	3·69	5·3	5·3	
38	"	Excelsior.	4·45	6·3	6·3	
39	Thumm's Photogen.	Paragon.	3·36	5·3		Very bad oil. Had to put out light.
40	Chrysoline, Newark, Ohio.	Paragon.	3·52	5·2	5·2	
41	" "	Excelsior.	3·76	5·3	5·3	

COAL-OILS.

The oils employed in this investigation were taken from the barrels obtained by Mr. H. C. Lawrence direct from the manufacturers, with the exception of the first consignment of Austen's Kerosene, bought from the company's agent at Chicago. The barrrel of Maysville oil was from Mr. Peter McCormick, who states that he has sold this oil exclusively during the past winter, to the satisfaction of his customers.

The oils differ somewhat in density. (Table I., col. 5.) Those from Kentucky (from the Breckenridge coal) being specifically the lightest. The latter oils begin to boil at a somewhat lower temperature. The temperatures given in col. 6, Table I., are those at which full ebullition sets in, from which point the temperature rises slowly. At about 212° F., a few bubbles of vapor arise in the oils, and increase gradually to the point of perfect ebullition, below which the loss of liquid distilled is very trifling. I suppose that 400° F. may be assumed as the boiling point of these coal-oils. I have pushed the temperature to that point in the Kerosene, Lucesco, and 1st Cloverport oils. There was, unfortunately, no opportunity of submitting these liquids to even a rough fractional distillation.

The color of the oils varied from a light-faded yellow to a dark chesnut brown, in the following order: Lightest—2d Kerosene; 2d Cloverport; Maysville; Chrysoline; Adair & Veeder; 1st Kerosene; 1st Cloverport; 2d Lucesco; 1st, Lucesco, darkest.

Specimens of the two last oils, contained in small white bottles, having been accidentally placed in the sun-light, were, in a few days, bleached to a degree equal to the lightest.

The odor is also variable; that of the 2d Kerosene being the least, and that of the Lucesco the most offen-

means are obtained by taking the averages of the oils consumed on the one side, which gives (col. 7, Table I.); those of the intensity of the lights on the other (see col. 10, Table I); and combining these two to arrive at the relative value of the oils given in col. 11, Tab. I. Where the light diminished during an experiment the average of its light, at beginning and end, was taken to be used in forming the mean. This method is not quite satisfactory for all of the oils, because the mean of the first and last intensity of light, during an experiment, is not always a fair average of the light. In ex. 4, the Dietz burner gave the light of fourteen candles for three hours, which then diminished suddenly to that of eleven candles, and continued to diminish so much that the oil consumed in four hours was not estimated. It sometimes happens that a single fibre of the wick springs up and gives rise to a slightly smoky flame of less luminosity, and which is further deteriorated by an excresence of lampblack growing upon the fibre. This may be sometimes removed by turning the wick down and up, after which the brilliancy of the light is in a measure restored.

Notwithstanding this objection, my averages are nearer the truth than could result by employing either the greater or less intensity of light in an experiment where the light diminished, and regarding them as applicable to coal-oil in general, are close approximations to the truth, especially since the dimunition of light with the small burner was generally very trifling, and in most of the experiments imperceptible.

The measurements of consumption of oil were correct, and were obtained as follows: Bottles, accurately gauged to a mark upon the neck, were employed to fill the lamps. The latter, if dry, were first filled then emptied, to saturate their inside—as well as the wicks—with oil. The lamp, after an experiment, was emptied into the measuring bottle, and by a small accurate graduate the quantity of oil necessary to fill the bottle to the mark on the neck was noted as the consumption in four hours. The results are accurate to the 1–100 of a fluid ounce. They were frequently checked by emptying the lamp into a large graduate and noting the consumption thereby, then placing the oil in the measuring bottle and noting the consumption by the restoration of oil to the mark. In these cases the results always agreed. The same kind of wick, lamp, chimney, and burner were employed in these experiments, as noted; thus, the same small paragon, excelsior, &c.; consequently any variation in the result cannot be attributed to a difference in the burners, &c.

I regard the result marked 8–16 (col. 11, Table I.) as the most reliable, since it proceeded from a large number of experiments upon a good oil, of which the light, with a small burner, did not sensibly diminish during four hours. The relative cost of this oil (0·134 cts. per hour) differs only 0·004 from the mean cost of all the dollar oils in all the small lamps; while the respective lights are in the ratio of 5·5 to 5·3 candles. Austen's Kerosene is the dearest oil, its specific cost being 0·181 cts., and the mean candle power 5·2. The manufacturers of this oil have evidently sacrificed its illuminating qualities to the diminution of color and smell, at least judging from the oils received in this city, for the wick incrustation, even in small burners, causes the light to diminish sensibly in four hours. The relative illuminating value of the oils may be inferred from experiments 3, 23, 24, & 30, Table II., in which they were tested under precisely the same circumstances, in the same lamp, and with the same wick and burner. The lamp, a long one, was of unfavorable shape for coal-oil, since, at the expiration of four hours, the surface of oil was five inches distant from the burner, consequently much incrustation of the wick would lessen its capillarity sufficient to cause a considerable diminution in the intensity of light. Under this test, the light of the first bbl. of Lucesco oil experienced in four hours, a dimininution of only ¼ of a candle from its initial power of 11 candles. The 1st Cloverport diminished 2 candles, and the 1st Kerosene from 3 to 4½ candles. The 2nd bbl. of Lucesco was the worst of all the oils tested, with the exception of Thumm's Photogen. The value of the 1st Lucesco oil, in large burners, is shown by Ex. 5, Tables I. and II. In this, the Dietz burner, which gives the whitest of coal-oil flames, the specific cost per hour is 0·12 cts., and the actual candle-power is 14, not diminishing during four hours. The shape of the oil vessel (New York pattern) is a very oblate spheroid, in which the surface of the oil, after four hour's combustion, is distant only 2¾ inches from the flame. This shape is the proper one for coal-oil lamps Those employed in experimenting with the smaller burners had a similar oil vessel.

In summing up the results of these experiments, as to the relative cost of burning all the oils (except Kerosene) by all of the small burners, we may infer that coal-oil gives a light of 5·3 star candles at an hourly cost of 0·733 cts., which is equivalent to 0·138 cts. for the light of 1 star candle, and about 7 mills for a 5 candle-power. 7 mills is about the cost of a star candle per hour, hence coal-oil, with the present small burners in actual use, gives five times the light of a star candle at the same cost. But this value is based upon a snuffed candle, and star candles are never thus treated, consequently (by dividing 5 by 0·85) the light of coal-oil lamps is equal to six star candles as they are usually burned, which makes it the cheapest of all the lights examined, not excepting the Lafayette gas.

The actual cost of coal-oil to that of the light of one tallow candle is as 2¼ to 1; but if the amount of light be taken into consideration, tallow, when burning its best, costs three times as much as coal-oil; as usually burned, nine times; with a long wick, twenty-six times as much. Compared with burning fluid, the actual cost of burning a coal-oil lamp is by a shade in favor of the coal oil; while, for equal light, the latter is 3¾ times cheaper than burning fluid. It must not be forgotten, in these comparisons, that coal-oil flames can, within bounds, be turned down to give less than their full light at a proportionally lower cost for burning.

The actual cost of burning lard-oil in the Cornelius' lamp is four times greater than that of coal-oil in the small lamps. For equal lights coal oil is 2½ times cheaper.

In the foregoing comparison I have not considered the cost of broken chimneys and the expenditure for wicks. The former item need not be a large one. During a period of over six weeks employed in daily coal-oil experiments, I have not broken a small chimney; nor has one been *washed;* the breath and a silk handkerchief being alone needed to remove the slight cloudiness deposited, and a brush to wipe off any accidental smoking, which happened but rarely. In fact the chimneys are less clouded than by any other oil. A lard lamp chimney requires *washing* at least every other night.

In a family in this place, burning a Cornelius' lamp every night during three fourths of the year, the average breakage of chimneys in three years, was one a year when the lamp was attended to by the lady of the house, and three a year when managed by servants. I think, therefore, that the cost of chimneys may be omitted in this calculation. The cost of wick is also insignificant; a dime will buy a dozen wicks, of which sixty inches are available; these, at the rate of one-eighth of an inch removed at every trimming, would last 480 nights. It may seem a trifling matter to be alluded to, but I suppose every one using coal-oil has experienced how much depends upon trimming the wicks. A very little difference in trimming makes a very material difference, not only in the amount of light of a coal-oil lamp, but in the whiteness of the light. A strong, sharp pair of scissors, with a thin lower blade, gives the best results.

Comparison of Coal-Oil Lamps.

The following lamps were examined:

The Knapp patent (a large burner); the large and small paragons of Wm. Fulton, 1858; the large Dietz, 1859; and the following small lamps: Drake's double wick; the Waterbury lamp of Wade & Bornham, 1858; the Excelsior of Holmes. Booth & Hayden; and the combined lamp of E. F. Jones, 1858, and R. S. Merrill, 1859.

There is no particularly new principle involved in any of these lamps; known means being employed for effecting a powerful combination, by various ingenious devices.

The Knapp lamp, which carries an argand wick with moveable deflecting button, gives a good light with pure oil, but has been generally abandoned on account of its complicated arrangement, and the want of an external movement for the wick. The remaining burners carry flat wicks, which, in the Dietz and large Paragon, are 1½ inches wide and 1-16 thick. The wicks of the Jones' Merrill, small Paragon, Waterbury, and Excelsior, are ⅝ wide and 1-16 thick; the Paragon, being capable of carrying a somewhat thicker wick. The Drake lamp bears two wicks; a thick one, which does not burn but feeds the other wick, which is 9-16 wide and 3-32 thick.

In an experiment with the 1st Lucesco oil, this lamp burned very badly, the flame being very tremulous and spitting much.

The Waterbury lamp also burns badly, and is defective in the shape of its deflector, and in the nature of its draught.

The relative performance of the remaining lamps appears from Table III.

The following interesting experiment demonstrates the value of the Merrill improvement upon the Jones lamp. The lamp was opposed upon the photometer to a Paragon flame of exactly equal light; without touching the wick or extinguishing the flame, the Merrill tip was *removed*, which diminished the light from 1 to 0·88. *Replacing* the tip re-established the former equality of light. This tip, therefore, adds 1-10 to the illluminating power of the Jones lamp, and, with the tip, the flame is not only steadier but whiter.

The following experiment illustrates the diffusing effect of a ground-glass globe upon the Cornelius' lard lamps. The photometer screen being six inches in diameter, a globe, ground and slightly cut, of 8¾ inches diameter, diminished the illuminating effect upon the screen from 9 to 7¼.

In reviewing the lamps of Table III., preference should be given to the Excelsior, which, compared with the smaller burners, yields the most and whitest light. The machinery for moving the wick ought to be put together more carefully, for in the majority of a number of burners examined, the teeth of the wheels do not act upon the wick simultaneously, which throws it sometimes a little to one side. The Paragon, and Jones' Merrill, are both good lamps. The latter gives, relatively, a somewhat whiter flame, but is a little more complicated, and more troublesome to be cleansed. Ether readily removes the brown deposit, forming, especially with inferior oils, upon the wick-holders of the lamp. With bad oils, small excresences of lampblack sometimes form at the corners of the wick; these appear to deposit more readily on the Jones' Merrill, which has no draught at the corners of the wick.

TABLE III.

Comparison of Coal-Oil Lamps.

No. of Ex. from Table II.	Lamp.	Star Candle-Power.	Lamp.	Star Candle-Power.	Ratio of foregoing.	Ratio by direct comparison.
4-15	Dietz.	14	Small Paragon.	5·3	2·64	2·30
Seperate Ex.	"	14	Jones & Merrill.	"	2·64	2·50
23-32	Large Paragon.'	11	" "	"	2·08	2·10
31-7	Jones & Merrill.	4·8	Drake.	3·6	1·32	1·40
16-50	Excelsior.	5·9	Paragon.	5·3	1·11	1·18
36-34	"	"	"	"	1·11	1·10
20-21	"	5·6	"	"	1·06	1·11
38-37	"	6·3	"	"	1·19	1·12
28-29	"	6·2	Jones & Merrill.	"	1·17	1·11
35-33	"	5·9	" "	5·0	1·18	1·10
9-12	Small Paragon.	5·3	" "	5·3	1·00	1·00
14-32	" "	"	" "	"	"	"
26-27	" "	"	" "	"	"	"

In this Table the 1st column refers to the experiments of Table II., of which the respective candle-power results appear in columns 3 and 5. In these experiments the lamps indicated were also compared directly with each other upon the photoneter. From these results column 7, which expresses the illuminating power of the lamps of the 2nd column, in terms of those of the 4th column. Column 6 denotes the same ratio derived from the candle-power of the respective lamps.

The numbers of the last column are generally somewhat smaller than those of the 6th column, which is readily accounted for. The photometer-room was my study, having symmetrical walls of light neutral tint, and similarly furnished behind the lights upon the photoneter-bar. The brightest light was placed in the centre of the room, which brought the candle four feet nearer to one of the walls. By holding sheets of black paper around the lights, I found that the photometric results were correct for candles, and for the latter opposed to a bright light. When, however, a five candle coal-oil lamp took the place of the standard candle, its reflection from the wall behiud it affected the position of the spotted screen, as was ascertained by the blackened paper. As permanent blackened screens would have been inconvenient in my case, I give the results as determined, observing that the truth will lie between the numbers of the 7th and 8th columns.

The Table shows that the light of the Jones' Merrrill lamp is equal to that of the Paragon. For these lights, the consumption of oil was also equal. (See Table II.) Than these, the Excelsior gave generally more light, burning proportionally more oil.

It may be proper here to allude to the candle-powers in the different Tables. It would be wrong, from the C. P. of Table 1., to infer the relative value of the oils in respect to their illuminating power. The averages were calculated thus, instead of estimating the consumption of oil for a fixed candle-power, to obtain 5·2, the mean C. P. of all the oils in all the small lamps. Whether this method serve the best practical purpose to consumers or not, it does not effect the main object of Table I. which is set forth in its last column, and from which the relative value of the oils must be inferred. The relative candle-power of the small lamps may be ascertained by taking their average performance from Table III., from which it results that the Paragon and Jones' Merrill generally burn with a candle-power of 5·3, and the Excelsior with one of nearly 6, the latter yielding also the *whitest* flame.

The large Paragon gives twice as much, and the Dietz 2½ times as much light as the small Paragon or the Jones' Merrill.

The observation was made that the small Paragon flame of Ex. 13, burning in its usual manner, with a C. P. of 5·3, yellowish at the top, possessed an illuminating power of four candles, when turned down to a flame of perfect whiteness.

Of the large burners, the Dietz gives the most and whitest light; but the chimneys are more easily broken and not readily refitted, besides, the deflector carrying them is quite shaky.

The large Paragon gives a relatively less white flame than the small lamp of the same name.

The chimneys of the present style of coal-oil lamps approach frustrums of cones, *base* to base, like the shape of the iron blast furnaces, and are of powerful draught. When flat flames burn in such, the current has a tendency to form eddies at the corners, as may be seen when the lamp is made to smoke slightly. Consequently, more air is required at the middle and less at the sides of such a flame, which effect is produced with good results by the shape of the cut in the deflector of the Dietz and Excelsior, and by the tip of the Jones' Merrill. The paragon deflector has parallel sides and circular extremities, and in the large paragon it was found necessary to bore a series of holes along the sides of the cut of the deflector.

While the present coal-oil burners appear nearly perfect, the oils are susceptible of much improvement. There is no excuse for the want of it, for the light is cheap enough to bear, if necessary, an increased cost. The manner of the improvement is sufficiently indicated by Dr. Antisell's book, and by the masterly research of Vohl. (See Jour. für Practische Chemie. Vols. 67, 68 and 75; pp. 418, 504 and 289.)

An examination of the coal-oil wick crust shows it to be more of the nature of a deposit from the oil than a charring of the wick. A very good test for oils is to burn them in well trimmed and good lamps, as the Excelsior. If the light does not diminish sensibly in four hours, as is the case with oils of good quality, that oil will be the best which yields the least white deposit upon the chimneys and the least crust upon the wick. With bad oil a black color extends half an inch or more below the crust of the wick after burning. Any water in the oil has an extremely bad effect upon its burning qualities. The factories are sometimes heedless of this point. Last winter, on reaching the end of a bbl. of oil, nearly a gallon of water was found. Washing a lamp may be the means of passing an unfavorable opinion upon a good oil. The 2d Lucesco oil was at first tested in two lamps that had been washed, and, as was supposed, thoroughly dried with cotton. On burning the lamps, filled with perfectly clear oil, the light speedily diminished; the oil became milky at the surface, and a liquid (proving upon examination to be water) deposited upon the sides of the lamp, leaving a trace as the oil ebbed in it during the combustion. The lamps were emptied, dried with a cloth, and furnished with fresh oil and wicks, when the same result took place to a less extent, and again, but still less, after a third emptying and drying. On the fourth time they burned without any milkiness; but the experiments were rejected, and repeated with other lamps that had never been washed, when it was discovered that the oil, though inferior, was less so than the former lamps had indicated. After some difficulty, it was ascertained that this mysterious water proceeded from the plaster with which the cap of the lamp was cemented, which absorbed much water during the washing, to be gradually driven out by the oil.

The question is frequently asked, whether there be any danger in burning coal-oil?

A priori, there should be none with a liquid of so high a boiling point.

A six ounce bottle was half filled with blood-warm coal-oil, corked and well shaken.

A lighted match burned quietly in the bottle without explosion of vapor or kindling the oil.

A portion of oil spilled upon the warm iron ash plate of a stove could be kindled with difficulty; but the flame went out spontaneously, leaving the largest portion of the oil unconsumed.

Two lamps were purposely thrown from a table. In the first instance, the lamp was extinguished as the chimney broke; in the second, the flame continued burning in the wick, caged in its deflector, and without kindling the oil spilt around it. I think the conclusion warranted that there is no more danger involved in burning this than lard oil.

Lafayette Coal-Gas.

Messrs. Collier, superintendent, and Livezey, gas fitter, afforded me every convenience and opportunity fo testing the above gas.

It was measured by an accurate consumer's meter (dry), used at the gas-works for testing burners. The pressure was not noted, the gas being taken between the hours of 7 to 9½ P.M., at the close of February, 1860, from a house in the city, in the condition in which it is furnished to the public. The extreme flickering of the flame rendered the determination of the candle power troublesome; but the correctness of my measure of both gas and light may be inferred from Table I, where the specific cost of two different burners, consuming different amounts of gas, differs by only one thousandth of a cent.

The patent burner used consists of an inner fish-tail marked two feet, over which is screwed, as a cap forming a small air chamber, a batwing marked 6 feet. The inner burner alone consumed 3 feet per hour, with the light of 0·3 star candles; the outer burner alone, under the full eead of gas, consumed 6·67 feet per hour, yielding a light 7·64 candles. Together the consumption and light were as noted in Table I.

The second experiment was made with a six foot fish-tail burner of the size and kind in most general use here. The flame, adjusted for the best light by the superintendent of the gas-works himself, consumed 4 feet per hour, with a 6·53 candle power.

Reduced to 5 feet, this gas has, therefore, a power of 8·1* candles, which is very low. The coals employed in the Lafayette works are of inferior gas-making qualities. I understand from the President of the Company that it contemplates introducing a better coal from Pittsburg before long.

With respect to the relative value of our gas compared with other illuminators, it will be seen from Table I. that the actual cost of burning 3 feet per hour is 2½ mills more than for the average of the all coal-oil lamps consuming average oils, while the latter gives by nearly ½ of a candle more light. When gas and coal-oil are reduced to the price for the same amount of light, their cost is as 20 to 14, or as 1 : 0·7. In other words, 70 cents. worth of coal-oil will produce the same amount of light as a dollar's worth of Lafayette gas. Without counting the interest upon the pipes and fixtures, and adding $3 60 for yearly metre rent, it follows that persons burning $6.00 worth of Lafayette gas monthly, would, by using coal-oil, get the same amount of light, and save $25.10 yearly.

These deductions are not made with a view of throwing any discredit upon gas which, from its convenience, is better to be used, by those who can afford it, even at a greater cost, but to show that coal-oil can and does, in some localities, enter into direct competition with gas. Whenever this takes place it will benefit gas consumers by compelling the companies to furnish a more brilliant and steadier light, at a less cost, and with a more uniform density of the gas and the avoidance of whatever else causes the irregularity in the amount of the gas bills, of which it is now so much the fashion to complain of throughout the country.

The foregoing estimate of the cost of coal-oil light is based upon the retail price received here, of $1.00 per gallon.† It is already offered (with a warrant) in Cincinnati for 75 cents; and if the statement be correct that mineral naphtha is produced at 1 cent per gallon and sold for 10 cents, a retail price of 25 cents is even now possible for a highly purified article. Hence we may estimate the future cost of this light as follows:

From my experiments at—

Price per gal.	Hourly cost in small burners.	Specific cost.
$1.00.....	cts. 0.733.....	cts. 0.138
0.75.....	0.550.....	0.104
0.25.....	0.183.....	0.035

Note.—To understand the first part of this article, it will be necessary to correct the following typographical errors on page 230:

1st column, line 41, read—"*were* established by burning *halve s.*"
" " line 72, read—"By *Ure* this ratio."
" " line 13 from bottom, read—"Light 0·846" instead of 10·846.
3d " line 30, read—"*value*" for "*valve.*"
Table I., column 4, read "Cost per *Real lb.*"
" " 7, read—"*ft. cs.*" for "g. dr."

The last word in the first part of the article should be "coal-oil."

* 9·6, if the standard candle burn with a light—0·85.

† Since writing this article, the price has fallen in Lafayette to 70 cents.

NEW HAVEN, CT., CONTROVERSY.

NEW HAVEN, CONN., May 7, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

I received, on Saturday last, a copy of the eleventh number of your JOURNAL, apparently mailed from your office, containing a notice of the Gas Controversy in this city, closing with the following piece of advice, which was, doubtless, intended for my especial benefit, viz.: "The whole party had better become stockholders in the present Gas-Light Company, and subscribe to the AMERICAN GAS-LIGHT JOURNAL: we will then take good care of them." For one, I take your advice in good part, and propose to improve the example by reciprocating in kind, trusting it will be received in the same spirit.

I have taken, paid for, and read every number of your JOURNAL yet issued; and as my subscription closes with the next number, I enclose $3 in payment of the same for the year ensuing, and have to request you to send it to me direct by mail, instead of receiving it as heretofore, through a news-agent.

As regards the second branch of your advice, I would say that I have, for a long time, been trying, *with money*, to buy some of the stock recommended, but without success. How some of my fellow-consumers are to do it *without money*, as it takes all they can spare to pay their quarterly gas-bills, I cannot tell, but I am sure they would be grateful if you would inform them.

I find many interesting and instructive articles in your JOURNAL: hence I take it; but I must confess to a disappointment in its editorials. Those, in a few of the earlier numbers, led me to hope that your paper would prove strictly impartial in its position as between Gas Companies and consumers; but that expectation was long since dissipated; and I have come to consider it as simply the organ of those great monopolies; yet I must confess that I was unprepared for so frank, if not bold, an avowal as that in the article alluded to, viz.: that poor consumers must not only take your JOURNAL (which they might do), but that they must also take the stock of their oppressors (which is impossible), to enable them to be taken "good care of" by you.

I have no expectation that you will publish this letter; and I, therefore, use more freedom and frankness than I otherwise should, or than some whom you count your best friends would dare do, hoping I may find you in the same frame of mind with the poet Burns, when he penned these lines—

> "Would some power the giftie gie us,
> To see oursels as ithers see us."

Your JOURNAL now receives its chief support from existing gas companies and their *attaches*, and it is but natural that your line of policy should be shaped accordingly. I wish now to call your attention to another view of the subject; but, first, I will dispose of the New Haven Gas-Light Company, and then draw my moral from that. There have been no tumultuous meetings here. The two that were held were presided over by the Mayor of the City, were dignified and orderly, and no harsh epithets were applied to any one.

The New Haven Gas-Light Company commenced operations twelve years ago, with a capital of one hundred thousand dollars, the *whole* of which was expended under contract for works consisting of four miles of small pipe; a retort house of six retorts; a gas holder of 40.000 cubic feet capacity; an office; and the real estate upon which the works stood, without a dollar of capital to purchase a station meter, coal, custom meters, service pipe, and other necessaries, for all of which money had to be borrowed.

Twelve years afterward, to wit. on the first of January last, they had a nominal capital of $200,000; their pipe increased from four to twenty-four miles, many of them larger than the first; their retort house increased in capacity from six to thirty retorts; their gas-holder of 40.000 cubic feet increased by the addition of a new one of 100,000 cubic feet capacity; and their real estate, by the purchase of large additional tracts, increased four or five-fold: the present property of the Company being fully four or five times greater than the original works, or $400,000, basing its value upon the cost of the original; but as we all know *that* to have cost too much, being a stock operation,

We will call the value	200,000
They have about 2,400 meters, with the service pipe costing, say	25,000
Surplus cash on hand, Jany. 1st, 1860.	24,000
Coal, gas, and other materials, say	1,000
Profits divided in Stock,	35,0 0
The original works, say	50,000
Present value of assets,	$335,000
Of these assets, the Stockholders paid for the original works,	50,000
Additional cash capital paid in,	65,000
	$115,000
It will thus be seen, that the consumers have paid for these works, in profits,	220,000
And the Stocholders only	$116,000
	$335,000

The Company have paid regular dividends ever since they commenced, except for the first year or two, during which time they were compelled to retain their receipts for the purpose of refunding the money borrowed for working capital; and they reported themselves as out of debt last January.

And all this has been done upon a business of less than 12,000,000 cubic feet per annum, by charging $4.00 per 1000 feet, less 5 per cent. for prompt payment, until last December, when, under outside pressure, the discount was increased, to 12½ per cent., for an article often very poor, and never of the quality they claim for it: and which you and I know can be made on the seaboard at about 80 cents as around Boston, of Pictou coal, to $1.25 per 1000 feet, at the outside of half Cannel and half Newcastle.

Now, this is all right for the past, because we agreed to it by our silence. We now object, and propose to make terms with them, or manufacture our own gas. They ignore our proposition, and endeavor to prevent us; if they can, very good. We are 2,400 citizens, consumers of gas, and comprise the great business interests of the city. A large proportion of us have united in a pledge to sustain a new company, and to oppose a monopoly that knows no reason, and is blind to its true interests. Let the consequences rest there.

Now to the moral. The consumption of gas last year was about 24,000 000 cubic feet, and at the present price, doubles once in about five years. Upon a suitable reduction in price, with the facilities for furnishing it, the consumption would double probably in two years. The present company have not these facilities. The entire capacity of their works and system is fully developed. We hold that it is just as cheap for a new company to lay new pipes through the same street, as for the present company to *take up* and relay the old pipes; the business is ample to support two companies; and public interest and sound policy demand the increased capital of $300,000 to be invested in a new company, chartered under proper restrictions, rather than in an old one, with no restrictions or responsibility, for the purpose of increasing a power which they have proved themselves capable of exercising without regard to fairness to their customers.

This is but a type of the position of a large portion of the four hundred companies in the United States. Already the people are looking into and stirring in this matter. The movement will soon become general. In some places, the action may be hasty or ill-directed, and fail; but revolutions never go back. Each of these companies has its hundreds and thousands of consumers: fifty to five hundred consumers to one stockholder. Besides, opposition is an active principle: the outs are always gaining upon the ins. Can any Congress of Gas Monopolies put down the People?

Looking at the subject from this point of view, let me ask, is it well to sneer at a movement of the people, as did the sinners of old at Noah, when he went into the ark, and say, "that it was no great deal of a shower coming?" Does is not become the duty of the stockholders to look to it that the obstinacy of their officers does not compromise their interests? Is it not better for journalists to look to it that they are not found committed to a line of policy, which, sooner or later, they may regret? All may learn wisdom from the Gas Controversy in Cork, notwithstanding the comments of the *English Journal* and your own in copying it.

Respectfully yours,
O. F. WINCHESTER.

REPORT OF THE RIO DE JANEIRO GAS-LIGHT COMPANY.

We are in possession of the Report of the Company to December 31, 1859, signed by the Chairman, Baron de Maua. The capital is £270,000. The works and plant cost £270,650.

CASH ACCOUNT.

DR.

	£.	s.	d.	£.	s.	d.
Nett profits from the sale of gas, gas-fit'gs &c., 1858	52,133	14	10			
Nett profits from sale of Coke for six months,	2,195	7	9	54,343	12	2
Balance of cash from 1858,	14	9	7			

CR.

Allowances and bad debts,	796	1	10			
Balance of interest, . .	2,485	11	2			
Salaries, ...	4,569	10	9			
Dividends, stamps, reserve fund, &c., ...	4,185	9	2			
Balance carried to 1860,	6	19	3	54,343	12	2

On January 1, 1860, there were lighted by gas 4,828 private and public buildings, and 4.649 public lamps. Total length of mains 100 miles. The private consumption admits and promises a large increase, not more than one-fourth of the buildings in the gas district being supplied at present. The use of coke for culinary purposes was being introduced. [Why not encourage the use of gas at once?] The par value of shares is £33, 15s, paid up, and the last quotation was £47, 5s., about 140 per cent. The dividends are limited to 12 per cent. Ten per cent. of the nett profits is carried to the reserve fund, which amounts now to £15,000 sterling. The accomplished and energetic engineer, Mr. Ginty, is mentioned in terms of high praise for his zeal and talents, the work done under his superintendence proving substantial and permanent; even the mains which were first laid are now in perfect order. A new tank had been built to receive an immense gasometer, and all the affairs of the company, mechanical, financial and experimental, were in a prosperous and satisfactory condition.

We hope the Baron de Maua will be so kind as to place the AMERICAN GAS-LIGHT JOURNAL on his books for regular reports of his company's affairs.

REPORT OF THE MELBOURNE, AUSTRALIA, GAS-LIGHT COMPANY.

We are indebted to Mr. Alfred Priestley, Secretary of the city of Melbourne Gas and Coke Company for an interesting report of their affairs, dated January 20, 1860, presented at the shareholders half-yearly meeting, by which it appears that the gas rates for the half year had exceeded the previous six months by upwards of £3,500, ($16 80) notwithstanding the reduction in the price of gas from £1, 2s. 6d ($5.40) to 17s. 6d. ($4.20) per 1,000 cubic feet, during which time upwards of 200 additional public lamps had been lighted, and nearly 600 new consumers been placed upon the books. The company, with a commendable policy, had resolved to lay service pipes to the houses of intending consumers free of charge, and the result was, of course, a marked increase of consumers. New coal stores and workshops were being erected, and a large addition of mains and service-pipe provided, to keep pace with the growing wants of the community. A further reduction in the price of gas to 15s. ($3 60) was contemplated, and, as a consequence, the company is popular and prosperous, and the use of gas becoming universal.

The capital paid up is as follows:

Old shares,	£99,910 0 0
New do.	49,868 0 0
	£149,778 10s.—($720,700)

PROFIT AND LOSS ACCOUNT,

For the Half-year ending December 31, 1859.

DR.

	£.	s.	d.	£.	s.	d
To coal carbonized.....	9,881	4	6			
" rosin distilled.....	265	16	7			
" lime for purifying.....	385	5	0			
" general charges, viz.: Directors' allowance [a good idea, as it keeps them up to time on the eighth commandment.. ED.]						
" salaries, wages, rent, taxes, &c.	9,657	3	1			
" material used, viz.: service pipe, fittings, &c...	1,148	7	7			
" repairs, interest, &c.....	3 032	9	11			
" profit for the half year....	13,731	3	11			
				38,101	1	0

CR.

	£.	s.	d.	£.	s.	d.
By Gas Rates.....	34,066	2	7			
" Residual Products, viz.:						
Coke sold and in store.....	2,159	10	6			
Tar, do.	248	4	8			
Breeze.....	5	5	0			
	2,413	0	2			
" Rec'v'd for service laying,	403	5	9			
" Interest, rent, &c.....	1 219	2	1	38,101	10	7
Balance of Profit, June 30. 1859.....	£22 296	15	0			
Less amount required to pay Dividend	9 000	0	0	13,296	15	6
Balance of Profit as above, ...				13 731	3	11
Am't Profit carried to Gen. Bal. Sheet,				£27.027	19	5

It is an old saw that a gas-engineer is known by his Reports, and on this principle the Melbourne Gas Company have an energetic and intelligent resident engineer in Mr. Stephen Hutchison, whose able report is appended to the above. The Company's previous engineer having been removed in August last, Mr. Hutchison was comparatively a new hand at the bellows, but he has, evidently, the works entirely under his control, and in a state of great perfection, for which purpose the directors had apparently given him a *carte blanche*, the only judicious course with a competent officer. Mr. Hutchison speaks of the illuminating power and purity of the Melbourne gas as bearing a most favorable comparison with that of any of the British or Continental cities. He had laid some 14 miles of new mains, making a total of 35 miles of mains then in use. The township of Flemington had just been supplied with gas, and the penal department of Fentridge was in course of supply, when the Sydney road and the Municipality of Brunswick would be supplied with a branch from that source. As a wind-up to the meeting, a semi-annual dividend of 6 per cent. was announced, which was received without a "vote of censure" by the shareholders, and the meeting terminated with the unanimous approval of all parties.

We wish Mr. Hutchison would favor us with information of the kind of retorts (clay or iron) used by him, and such other information as will interest engineers elsewhere, and promote the general good.

Will the other Australian gas-light companies also be so obliging as to forward us their reports? and if there be any water companies there, we extend the invitation pressingly, to them, as well.

REPORT OF THE CHARTERED GAS-LIGHT CO. OF LONDON.

We present to our readers a condensed review of the Chartered Gas Company's meeting at the works, Horseferry road, Westminster; Benjamin Hawes Esq., the Governor, in the chair, the Secretary, Mr. Bures, reading the Report for the half year.

The capital is £652.500. Cost of Works at the Westminster, Brick-Lane and Curtain Road Stations £590,763, 13s. 9d.

CASH ACCOUNT.

DR.

	£.	s.	d.	£.	s.	d.
Rental of Light for the half year,	99,898	17	5			
Coke and Breeze,	15,883	18	0			
Tar and other products	3,083	16	9			
Sundries,	2,654	4	4	120,470	16	6
CR.						
Coals consumed in the half year,	50,383	12	3			
Retorts and setting,	3,289	18	9			
Lamps and lighting,	1,943	4	0			
Carrying on the works,	2,228	14	2			
General wear and tear and mains,	8,051	17	11			
Meters and "fixing,"	2,088	7	2			
Directors and Auditors,	1.256	17	0			
Salaries and commissions,	4,314	7	0			
Wages and contingencies,	12,515	8	10			
Law expenses,	227	6	0			
Bad debts,	1.221	4	9			
Other expenses,	4,651	15	3			
Balance,	28,298	3	5	120 470	16	6

The Governor moved that the meeting do agree with, and confirm the report of the Court of Directors, &c., whereupon a shareholder, Mr. Box by name, insinuated the very abrupt question, "Has your revenue increased in proportion to the quantity of coal used? you have not told us that." To which the Governor tartly replied, "I shall leave you to tell that." A Mr. Rhodes immediately seconded the motion to adopt the report, but Mr Box was not to be boxed up so unceremoniously and proceeded to develop his opinion of the cost of coals, and the Flemish account of their yield, when Mr. Gray expressed his regret that Mr. Box did not postpone his remarks until the deputy-governor had gone into explanations, which followed immediately, when Mr. Box stated that he had been refused the information in former years as to the price of coals, and asked whether, in the event of his calling at the office, there would be any objection to his being furnished with the price from time to time. The Deputy-Governor—"Yes, there would be." Mr. Box—"I think there is a great desire to withhold information from me." The Deputy-Governor explained why he would not give Mr. Box any further chance to complain by enlarging his stock of knowledge of the mystery of gas-making, and Mr. Gray thought Mr. Box knew too much already. He said Mr. Box had raised this question fifty times before, and if he lived fifty years more, he would do it as often again.

A general *melee* of words ensued, after which the Report was adopted unanimously, the Governor re-elected, the Secretary ditto; Mr Box was satisfied, Mr. Gray was content, Mr. John Box was informed on certain knotty points, and the meeting broke up harmoniously with a snug dividend in hand

These apparent criticisms on the accounts, confined as they are to one or two champions in each case, begin to look to us as if they are got up to keep off real cavils. There is some Pickwick-ishness about them, we suspect.

REPORT OF THE GREAT CENTRAL GAS CONSUMERS' CO. OF LONDON.

The half-yearly report, of which the following is a brief abstract, was presented at the meeting of shareholders at the London Tavern, April 27. Mr. Thomas Dakin, Chairman, and Mr. Massey, secretary.

The paid up capital is £172,166. The land, works, and plant are valued at £215,989, 13s. 3d.

CASH ACCOUNT.

DR.

	£.	s.	d.	£.	s.	d.
Gas rental for the year,	61,101	7	7			
Coke, tar, and amoniacal liquor,	12,881	19	10			
Transfer fees,	13	2	6	73,946	9	11
CR.						
Coals,	25,462	6	3			
Wages,	11,388	19	11			
Salaries,	2,301	11	5			
Chemical referees,	130	0	0			
Official auditors,	42	2	0			
Law charges,	496	0	7			
Arbitrator's award,	2,079	13	2			
Repairs and depreciation,	5,857	18	9			
Other items,	18,843	3	3			
Balance,	7,344	14	7	73,946	9	11

On reading the Report the Chairman delivered a congratulatory address to the shareholders, felicitating them on his ability to present the accounts with the Report, the auditors having hitherto issued the account direct to the shareholders. A good deal of local matter was read to the meeting, particular stress being laid on the good quality of the gas furnished, the rousing balance at the bankers' £5,221, 13s. 5d—[our Manhattan has two or three times this on hand all the time—ED.]—the large stock of coal coke, meters, &c.—£6,376, 16s. 3d—and other bounties of a generous Providence, winding up with a motion "that the reports and accounts be received and adopted," which was promptly seconded by Mr. Alderman and Sheriff Gabriel, when a proprietor, evidently in search of knowledge under difficulties, breaks the harmonious current by interpolating, "I should like to know how it is that the law charges are nearly £500?" This was a bomb-shell in the camp. Next came the query how it was that the arrears of gas rents for the quarter year amounted to the enormous sum of £30 420, 17s. 9d. The reply to this question is very significant, viz., £20,000 of the amount was for the last quarter, which they had not yet had time to collect; £10,000 was for public lamps The chairman added, "We have customers who, if we press beyond a certain limit for their accounts, say, as they have facilities for change, 'If you will not give us such and such credit—and they are very large customers too—we will go to another company.' We have therefore to do all we can for the interests of the Company, as well on the one hand to avoid making bad debts, as on the other not to lose our customers." Questions led to answers, and answers suggested new questions, until another proprietor, a Mr. Kerry, walked up and propounded new questions, all of which the chairman appears to have met manfully and honorably, for his motion was not only unanimously adopted, but he was as unanimously re-elected, and a vote of thanks to the Board passed.

We like the pluck of the "honorable proprietor," (probably a lord), and would give a shilling to know his name. Shareholders generally go to these meetings with silk handkerchiefs tied about their throats, take what is given them, and be it never so little, haven't the originality of "Oliver asking for more." We like exceedingly the respectful and intelligent tone of the discussion at the Great Central Company's meeting.

PURIFICATION OF GAS BY PEROXIDE OF IRON.

BY PROFESSOR S. BLEEKRODE, DELFT. HOLLAND.

THIS ore is used in the Danish Gas-Works; and there exists in Sweden, a patent for its preparation and employment, granted in 1859, to a gentleman of the name of Hovitz.

I was anxious to know the nature of this ore, spoken of as the cheapest known material for the purification of gas. I have analyzed the sample sent to me by the kindness of Mr. Barlow, and compared the Danish ore with ores of the same appearance, of the province of Gelderland in Holland.

HYDRATED PEROXIDE OF IRON.

	Danish Ore.	Gelderland. Apeldoorn.	Wormingen.
Peroxide of iron	66·04	61·30	65·22
Clay, silica	11·04	28·92	15·18
Water and humid substances	19·55	16·84	19·50
Alumina	1·80	2·82	—
Oxide of Manganese	0 85	—	—
Lime	traces	—	traces

The humid substances, soluble in potassa, are 8 per cent. nearly. It appears, also, that the Danish ore is a brown hydrated bog ore, or limonite, as found in several countries. In the Dutch province of Gelderland, there is enough to meet all probable demands.

The peroxide of iron is remarkable for its power of decomposing hydro-sulphuric acid gas at the ordinary temperature. When the native oxide, as a coarse powder, is mixed with a strong solution of this gas in water, in the course of a few minutes the putrid smell ceases, and even the reaction on a lead solution, or lead test-paper, will no longer be observed An experiment which shows this, may be made in a very simple way. The pulverized ore is laid on a common filter, and the hydro-sulphuric acid solution dropped upon it; the mass is afterwards washed with pure water. A milky-colored fluid, without smell, will result, containing finely divided sulphur and traces of sulphuric acid, under the form of sulphate of the protoxide of iron.

A large quantity of hydro-sulphuric acid may be decomposed in this way, ending by a state of complete saturation, which is evidenced by the black color of the sulphuret of iron. As is well-known, the sulphuret of iron can be restored to the state of a hydrated peroxide. It may thus be easily revivified, and becomes again effective in decomposing hydro sulphuric acid. By washing it after revivification by the influence of the atmosphere, the milky sulphur-liquid and the sulphate of iron will again be formed.

This reaction, well-known to the students of chemistry, is likewise observed, whether the native hydrated peroxide, brown ore, or the native non-hydrated peroxide, red ore, is employed, even when the native hydrated peroxide is deprived of its water and changed into red peroxide.

But, in every case, the physical molecular condition of the peroxide is of great consequence. When the oxide is mycro crystalline, compact, micaceous, or fibrous, then the reaction on hydro sulphuric acid will be either very slow or will cease, The same phenomenon will be observed when the precipitated hydrated peroxide of iron, as prepared by Hill's patent, is exposed to a red heat. Thirty years ago, M. Berzelius mentioned that the peroxide of iron, prepared by red heat from the precipited hydrated oxyide, is very difficult to dissolve even in strong acids. Now, what happens with hydrochlorich acid will certainly follow with the more feeble byrdosulphuric acid. When the peroxide acquires, by a stronger calcination, magnetic properties, it becomes, owing to its molecular arrangement, nearly inactive on hydro-sulphuric acid.

The presence of humid substances in the native ore is of secondary consequence; they have no reaction on the hydro sulphuric acid, but they may assist the absorption of the ammonia. In every case, the porous earthy oxides are the most active, and, when mixed with chalk, they gain even in power by revivification. The revivification, by free exposure to open air, or by ventilating the purifiers, produces sulphur, finely divided, and sulphuric acid. This sulphuric acid can be fixed by lime, and produces sulphate of lime, or gypsum, and this is now the principal substance used to convert the ammonia into a fixed and valuable salt of sulphate of ammonia. The revivification, by exposure to the air, assisted by washing, to remove the free sulphur and the soluble salt, is all that is wanted to restore the power of the peroxide of iron for the purification of gas, which is increased more than twenty-fold. So, by this elegant process, the noxious sulphur is utilized in the production of sulphate of ammonia, and the mixture seems never weary of performing its duty.

That the saturated peroxide of iron, removed from the purifiers, cannot be revivified by calcining, seems not to be owing to the loss of its water, but to the finely-divided suiphur in the mass, which forms sulphuret of iron with the emission of sulphurous acid gas. The peroxide of iron mixed with lime will even gain in purifying property by revivification under the influence of the atmosphere and washing.

It is unnecessary to allude to the history of gas purification and it is sufficient to say that several methods, given in the specification of patents, show how the simplest phenomena of chemistry may be misunderstood. The long discussed question on the hydrated precipitated, the anhydrous, and the calcined iron oxides as purifiers, might be settled by a simple trial. It is not even necessary to explain it by a catalytic action, as given by Mr. Hill, to its precipitated oxide, nor to assume with Messrs. Lowe & Evans, the "allotropic" condition of some native anhydrous ore as causes of its non-activity.

The phenomenon that the peroxide of iron furnishes oxygen to the hydro-sulphuric acid, belongs to the burning power, as called by M. Khulmann, the "*propriété comburante*" of the peroxide.

The purification of water from organic substances by filtration through the red hematite or Cumberland ore with coal, as advised by Mr. Thomas Spencer, is another example of the oxidizing power of the peroxide of iron. This purification is certainly not conducted or influenced by the magnetic property of the iron, but is owing to the power of the peroxide of iron to furnish oxygen.—*London Journal of Gas-Lighting.*

INTRODUCTION OF GAS-LIGHT IN XERES, SPAIN.

On the 2d of February the introduction of Gas-lighting was inaugurated in Xeres, to the greatest satisfaction of the public: an immense concourse of people had gathered on the *Place de la Constitution*, there to gaze at the effect of the new light. At the municipal palace, a gigantic shield bore the coat-of-arms of the city in a blaze of light; and numerous burners exhibited a trophy surmounted with the Royal crown with the motto "Long live the Queen."

A splendid entertainment in the sumptuous halls the City-Hall brought together the members of the municipal administration and a large number of distinguished guests. The Alcade offered the first toast. "H. M. the Queen, and the gallant army in Africa," and Mr. BEAU the engineer and general superintendent of the Gas-works for the Company responded, addressing more particularly the President of the municipality and the municipal counsellors, who had most efficiently assisted in the establishing of the gas-works, and to whom the citizens of Xeres were indebted for all sorts of local improvements.

Several other toasts were given, amongst them one to Mr. GUILPON, as an acknowledgment for his exertions in the starting and successful completion of the Seville Railroad; when the editor of our own paper gave as a last toast, "the prosperity of all Spanish rail roads."

Mr. A. BLANCHET, the chemical director of the gas-works, has organized, on the most perfect footing, the service of the lighting of the city by gas.

The works were constructed on the plans of Mr. BEAU, engineer and general superintendent of the gas works for the General Company of the Spanish Credit. This is the second city lighted by gas under the Company, and works are being most actively carried on to make the cities of Alicante, Carthagena, Burgos and Pampehena enjoy the same advantages.—*La Gaceta de los Caminos.*

WATER-GAS AT THE LODI POINT WORKS.—We understand that Mr. RENNY, proprietor of the Lodi Point Works at Bergen, N. J., has been using the Sanders Patent Water-Gas for several months, and reports it an entirely satisfactory light, thirty per cent. cheaper than rosin, and has ordered an additional and enlarged works, for his factory and residence. Mr. RENNY, besides being of high social standing and wealth, has a respectable scientific repute.

SALE OF THE KEROSENE OIL-WORKS.

Pursuant to the advertisement of the Receiver of this unfortunate concern, a large number of gentlemen assembled at the Company's works on Thursday, May 10, 1860, at 12 o'clock M. to witness the sale. The works are situated on Newtown Creek, Long Island, about one mile east of the Greenpoint ferry, at foot of Tenth street. Among those present were Philo T. Ruggles, Esq., Receiver; Messrs. W. H. Appleton, Abraham M. Cozzens. Peter Cooper, jr., David Austen, jr., L. Delmonico, S. L. M. Barlow, O. D. F. Grant, Louis Von Hoffman, William H. Newman, Colonel Bliss, Dr. John R. Knox, Eli Hoppock, of New York; Samuel Downer, of Boston; Messrs. Meyer, Underhill, Kelly, Atwood, and Whitney, of Philadelphia; and Messrs. Howland and Hicks of New Bedford, Mass., with others.

At half past twelve o'clock Mr. A. J. Bleecker, the auctioneer, mounted a temporary rostrum and displayed a map of the property, containing 125 lots, with new piers, wharves, bulkheads, several large new and substantial buildings, containing oil-vats, boilers, engines, receivers, &c, containing complete works for the distillation of coal oil, and which had cost the sum of $450,000.

The works were announced to be sold, subject to the privileges of a certain contract between the company and Mr. Samuel Downer, of Boston, of a royalty of one cent per gallon, and another with Mr. James Young, of Glasgow, Scotland, of four cents per gallon, for all oils distilled under their respective patents.

The auctioneer stated the upset price to be $75,000, and invited bids above that sum. Mr. Cozzens bid $76,000, Mr. Barlow bid $80,000, Mr. Cozzens bid $81,000, and between them the bidding continued up to $94,000 by Mr. Barlow, when Mr. Meyer bid $250 higher, and in bids of that small amount it continued up to $96,000, at which price it was struck down to Mr. Peter Cooper, jr. It is understood that, before leaving the ground, it was arranged that Mr. Cooper should admit Messrs. Appleton and Cozzens to an equal share of the purchase.

A few days previous to the sale of the works, the latter gentlemen had purchased 10,000 tons of Boghead coal on the premises, which gave them some advantages in becoming interested in the purchase of the works. The amount paid for the coal was $120,000.

Thus ends the history of the great Kerosene Oil Company, which, in five short years, made $120,000 in their regular business, but, by overtrading and various misfortunes, lost on the works, coal, &c., &c., at least $300,000.

We regard the purchase by the new company as worth a net profit to them of $200,000, as the works stand to-day in actual value, and we have no doubt, from the known business ability and means of the gentlemen interested, they they will realize large working profits, if they will manage it as private property, and keep clear of another public corporation, the great curse of enterprise in this country of ours.

RANGOON TAR, OR BURMESE NAPTHA.

This valuable mineral has constituted, for many years past, a very considerable item of export from Rangoon, the principal seaport of the Burmese Empire, and within a few days sail of Calcutta.

The wells, some five hundred in number, are situated near Prome, up the river Irrawaddi, and about two miles back from its bank. Their daily average yield is some 1,200 lbs.

The trade in this article was first opened about the year 1853, since when it has been largely exported to Great Britain, and, in smaller quantities, to the Continent.

The productiveness of these wells is enormous, as may be judged from the fact that the lowest annual estimate of yield is 30,000 tons, and apparently susceptible of still further and indefinite increase.

At one time it was supposed that the king, who had entered into heavy contracts for the delivery of the tar, would be utterly unable to comply with the conditions of the contract as to quantity. The result proved, however, that his Burmese majesty had not over-estimated the productiveness of this "mine of wealth."

Before the value of this mineral had become sufficiently known in Europe, its price was about three cents a gallon at Prome, and six rupees per 100 vis, or seven cents per gallon at Rangoon; but since 1855 it has become a government monopoly, when the contracts before alluded to were entered into by the king for the supply of certain English companies engaged in its purification. Within the past year £300,000 worth of the tar, it is said, has been in store at one time in London, having cost to import it considerably more than would allow it to be sold at a profit when manufactured. A statement has been made, although we cannot vouch for its accuracy, that it cost, laid down in London, £40 the ton.

The importation of the tar into England has, consequently, fallen off, and its use will, no doubt, be exceedingly limited until the article ceases to be a government monopoly, or the price is so much reduced as once more to allow manufacturers to employ it steadily.

The tar, in its natural state, is of a dark green color, and at a temperature of 40° F. has the consistency of butter. It flows spontaneously from the earth into wells about 150 to 300 feet below the surface of the earth, and is drawn up, by the Burmese, in buckets attached to iron poles, and immediately carried to the place of shipment on the Irrawaddi, where it is put on boats, in the bottoms of which the natives construct a rude basin of straw and dung to prevent its leakage. At Rangoon it is casked, and generally forms the entire cargo of the vessel that carries it.

In Burmah this petroleum is an article of universal consumption by all classes. It is used for burning in lamps, in its unpurified state, and as a protection against insects. Applied to ships bottoms, it protects them against the attacks of worms which infest the harbor of Rangoon.

PRACTICAL MANAGEMENT OF GAS-WORKS.

[*Continued from page 226 of the* AMERICAN GAS-LIGHT JOURNAL.]

THE GRATE-DAMPER.

It is beyond question that a difference in the mode of setting, in the quality of coke used, or in both these respects must variously determine the amount of air which may most economically be admitted to the grate; and upon the assumption of this premise are based the following remarks. The use of a damper at the mouth of the ash-pit must promote the accurate determination of the conditions of most efficient combustion. The writer may be mistaken in his idea that the plan obtains in Transatlantic practice, but, be this as it may, he is very far from claiming as original a method of which such frequent mention has been made. Before this series shall have closed, a bench will have been fitted with this appliance at one of our Southern gas works, and the test of practice applied to it. At the same works also, the experiment of auxiliary draft-flues to the ash-pit is about to be made.

The *rationale* of this last device hinges upon a fact which is familiar to many, if not most, of the readers of the AMERICAN GAS-LIGHT JOURNAL—that the combustion of the coke is very much more rapid towards the front than over the middle and back of the grate surface. This arises from more rapid reception of air at the front of the grate-space, and in the instance above named is sought to be compensated by a small flue 4 inches wide and 6 inches high on each side of the ash-pit, from which the two flues are separated by 4½-inch work, and with which they communicate by four small nostrils, two to each flue. These two nostrils are situated, one about the middle, and one at the extreme rear of the ash-pit, the former being 3×3 inches in cross area, the latter, 3×4½ inches.

IRON RETORTS.

Before leaving the fertile and almost exhaustless subject of the Bench of Retorts, a recurrence to the subject of side-ports to the furnace (AM. G. L. J., p p. 200–1) is necessitated by a suggestion which has been made to me, (and which may have occurred to others) of an instance in which they are employed with wonderful success. I refer to the setting of Iron Threes, adopted by John C. Cresson, Esq., the experienced and successful engineer of the Philadelphia Gas Works, and modified to a more compact adaptation by John Jeffrey, Esq., of the Cincinnati Gas Company. Both of these gentlemen have been, until quite recently, the most powerful of the advocates of Iron Retorts, and are almost unrivaled in the results which they severally obtain per retort and per ton. In Philadelphia, the yield of 7,000 cubic feet per diem per retort is almost without parallel; in Cincinnati, the average productive duration is 1,500,000 cubic feet per retort during a "lifetime" of 15 months; and in each of these works side-ports are exclusively adopted. A little reflection, however, will prove that these results of actual practice in no way militate against the position I have taken, for the Philadelphia setting is completely destroyed, with the retorts themselves, in seven or eight months; and even the remarkable duration of Mr. Jeffrey's setting seems a *bagatelle* as compared with a "lifetime" of thirty-two months, and, that when a retort is worked continuously at a white heat. The solution of the various issues which have been made is in fair way of complete elaboration; meanwhile, "*non nobis tantas componere lites.*"

TAR-PIPES.

A single paragraph may be devoted with propriety to one of the most singular hair-splitting dogmas that have ever been propounded in gas-making, or out of it. The fallacy, which I propose to subject to a brief analysis, is thus advocated, thoughtlessly, it may be—seriously, certainly.

"The tar pipes on the hydraulic mains were intended "to discharge the tar and ammoniacal liquor at the ends "opposite to those from which the gas is taken, *it being* "*evident, upon reflection, that the gas in passing along the* "*surface of the water in the hydraulic main must create a* "*current in the same direction in which it moves, and conse-* "*quently operate against a free discharge at the other end,* "I did not hesitate to revise this arrangement."

Now, by applying a little arithmetic to the boldly-assumed premise, (which I have ventured to italicise) we find this to be the true state of the case:—Let us assume as definite data the following: A stack of 20 benches of 20-inch clay retorts (fives) passing gas at the normal rate of 4,500 cubic feet per diem per retort through a hydraulic main whose clear cross area, *available for gas-way*, is 120 square inches. Now here we have an extreme instance, in which 450,000 cubic feet per diem traverses a small main, and yet, even here, the sum of the velocities of the two fluids, gas and tar, is actually less than 5½ miles per hour.

Now this is the *maximum* velocity, obtaining only between the gas outlet and the dip-pipes of the bench nearest to it, and cannot be considered as investing the above erroneous position with any sort of strength; and it is expected that the "friends (if any there be) and relatives" of this chimera will acquiesce in the "Requiescat" here penned.

THE ASH-PAN SCOOP.

As these papers are written in the only occasional moments of leisure afforded by business duties, it is to be hoped that their readers will excuse an inadvertent omission now and again. If, however, any be hard-hearted enough to say me "Nay," they need not "mark, learn, and (ostrich-like) inwardly digest," the Manhattan Ash-pan Scoop!

It not unfrequently occurs in the change from the use of iron to that of clay retorts, that the ash-pan needs to be lowered, and instances there are where this lowering of the pan has rendered it almost impossible to clean it by the ordinary methods. Useful as this scoop is for every-day practice, it is, in these last circumstances, simply indispensable. It is a flat, shallow shovel, with sides of two inches in hight, having a perforated bottom, and a handle suitably inclined for clearing the extreme rear of the pan; and being only ten inches wide over all, can be used with great facility. The perforated bottom allows the water to drain out, while it retains the breeze and ashes to be removed.

RETORT LIDS.

While repairing errors of commission, it may be well also to observe that the 84-lb. retort lids, alluded to in the preceding paper of this series, are embalmed *in extenso* in the Report of the Richmond (Va.) Gas Works for the year ending Feb. 29th, 1856.

WHICH ARE THE BEST GAS-COALS?

The question, of the most advantageous coals for gas-making, is one of surpassing interest and paramount importance, and necessiates the consideration of two entirely different classes, viz., American and foreign.

In regard to the former, it is difficult for a gas-engineer on the Southern Atlantic seaboard to do it full justice; and it is precisely here that the writer feels more than ever the need of the courtesy and forbearance of his colleagues and brethren.

Many, if not most, of the interior companies are restricted, by local causes, to a narrow range and short list of available coals, while those on the Atlantic coasts have many of the American and all of the English coal-fields open to their selection. To give, therefore, advice of general application is merely impossible, and no more can be done, without invading the penetralia of experimental chemistry, than to make brief mention of two or tree of the *very best* American coals. Among these the best known are mined by the Westmoreland Coal Co., and are remarkable for their joint yield of gas of high candle power, and coke of great purity and considerable strength. The Westmoreland coals are also less contaminated with sulphur than many other of the American coals, and (especially when freshly mined) bear transportation better than any other caking coals with which I am acquainted. It has been asserted as an objection to these and other coals of Western Pennsylvania, that they require a very high temperature for their complete carbonization, but a sufficient denial of the validity of this position is near at hand. Lewis Thompson, Esq., whose name is familiar to the gas-world as the author of "The Chemistry of Gas-Lighting," tells us that *all* coals containing a large amount of volatile matter require high temperatures for its complete expulsion; so that this objection really resolves itself into constructive evidence of a high gas-product. And as this digression is commenced, it may also be observed, in continuation, that this development adds another to the arguments in favor of clay-retorts, for they can continuously be subjected to the temperature demanded by the staple used, be that temperature what it may. When once, on the other hand, the maximum heat economically appropriate to iron retorts is reached, the very nature of their material whispers pointedly to the gas-maker "*Ne plus ultra.*"

A tabulated synopsis of the most noteworthy of American coals is in process of preparation for the next issue of the AMERICAN GAS-LIGHT JOURNAL, and as its results will be compendious no extended dissertation is either appropriate or necessary here.

While in charge of the Knoxville, Tenn., Gas-Works, it was the good fortune of the writer to meet with a coal of (in some respects) singular characteristics. It was known as the "Poplar Creek" coal, and mined in either Morgan or Anderson county of that State. It possessed a short conchoidal fracture, not unlike that of many of the English cannels of the Lancashire coal-fields, and the illuminating value was high, though no determinate photometric tests were applied to it. During distillation it intumesced and formed a semi-plastic, adhesive mass, which circumstance determines its claim to be classified as a caking coal. Yet, in fracture, in lustre, and in a small yield of coke, of fine fibrous texture, it perilously assimilates to the Wigan cannels.

It is not many years since a self-styled chemist wrote a report, *to order*, upon the unnecessary extravagance of building coal-sheds, and heroically attempted to prove, what he was, doubtless, paid to prove, that the adaptation of a coal to the use of the gas-maker was utterly impregnable to any atmospheric or hygrometric influences.

COAL-SHEDS.

Such misrepresentation as this is not the only cause which, for a time, has rendered small companies strenuous in their opposition to enlarged coal stores. The examples of the Manhattan, Brooklyn, and other of the

larger companies, have served to silence many requests for a coal-shed on the part of superintendents. Other companies are *too poor* to build sheds. Small matter for wonder, when one of them made the candid confession—*(Credat Judaeus Appella, sed non ego)*—"We cannot afford to pay $3 per annum for the AMERICAN GAS-LIGHT JOURNAL." Here, then, we have three arguments against the protection of coals from the weather: First, perverted chemistry; second, bad example; third, a suicidal economy. Upon the first point, it becomes interesting to quote the following from the "Chemistry of Gas-Lighting"—*(London Journal of Gas-Lighting*, vol. 2, p. 222):

"Again, as regards impurity, vast importance attaches "to the amount of moisture contained in the coal, and "which, since it is quite accidental, must not be looked "upon as a constituent of the coal; but when a large "quantity of this moist coal is thrown into a retort, the "outer service, after undergoing for some time the action "of the fire, is converted into coke, and the bi-sulphuret "of iron into proto-sulphuret of iron, over which latter "the steam from the interior of the mass of coal passes, "with, of course, the same results as if this proto-sulphuret of iron were purposely subjected, at a red heat, to "the action of the vapor of water; that is to say, the "two compounds mutually decompose each other, and "give rise to oxide of iron and sulphuretted hydrogen, "so that, by mismanagement of this kind, the whole of "the sulphur contained in bituminous coals may be "made to pass into gas, and thus double both the labor "and expense of purification."

In reference to the second point, the sole reason which, *until recently*, has prevented the erection of sheds by some of our largest companies, has beee the difficulty of clearing their yards sufficiently to allow of their so doing. The superb shed arrangements of the Manhattan, the Philadelpha, and the Brooklyn Gas-Works, are now, however, complete, or nearly so, and an examination of either or all of these will now forcibly dispel the deductions of an erroneous logic, than any representations of mine.

If any company believe themselves too poor to build coal sheds, they are *ipso facto* too poor to make and vend coal-gas. There is no measure so prolific of actual, tangible benefit if adopted, nor is there any the neglect of which brings such a Protean crowd of practical evils in its train.

Common sense is sure to have its perfect work in this regard, and even this incomplete *resumé* may, to an extent, influence the thinking minds of our smaller companies towards a more complete consideration of the facts and arguments in the case.

THE MOTION OF GASES.

[*Continued from page 207 of the* AMERICAN GAS-LIGHT JOURNAL.]

PRACTICAL EXAMPLES.

26. We proceed in the next place to give a few illustrations of the practical use of some of the preceding formulas.

Example I.—Let it be required to determine the increase in a given volume of coal gas at 32° Fahr., in consequence of an elevation of temperature to 50°.

For this, formula [6] is applicable; whence placing for e its value from [5] and for t—32 its value 50—32=18, that formula gives

$$V = (1+0{\cdot}00204\times 18)\ V_0 = 1{\cdot}0367\ V_0.$$

Suppose $V_0 = 20{,}000$ cubic feet, then will

$$V = 1{\cdot}0367 \times 20{,}000 = 20.734 \text{ cubic feet.}$$

Example II.—Let it be required to determine the volume of hydrogen, under the pressure of 29 inches of mercury, and at the temperature of 70° Fahr., which would be due to the oxydation of 1 lb. of zinc.

Since, for every equivalent, or 32 52 parts of zinc, there would be evolved one equivalent, or 1 part of hydrogen, it follows that for 1 lb = 7000 grains of zinc, we shall have

$$\frac{7000}{32{\cdot}52} = 215{\cdot}25 \text{ grains hydrogen;}$$

and since one cubic inch of hydrogen weighs 0 0216 grs. at the normal conditions of temperature and pressure, we have

$$\frac{215{\cdot}25}{0{\cdot}0216} = 9965 \text{ cubic inches} = 5{\cdot}766 \text{ cubic feet}$$

of hydrogen at 32° Fahr., under a pressure of 29.92 inches of mercury. To find now the volume under the required conditions of temperature and pressure, we make use of [19], placing for e its second value from [5], and

$$V = V_1 \frac{p_1}{p} \cdot \frac{458+t}{458+t_1};$$

or, observing that we have

$V_1 = 5.766$, $t_1 = 32°$, $p_1 = 29''{\cdot}92$, $t = 70°$, $p = 29''$, this formula gives

$$V = 5.766 \times \frac{29.92}{29} \times \frac{458+70}{458+32} = \frac{5{\cdot}766\times 29{\cdot}92\times 528}{29\times 490}$$

$$= 6{\cdot}41 \text{ cubic feet.}$$

Example III.—Let it be required to determine the density of a certain coal gas, at a emperature of 25° Fahr., and under a pressure of two inches of water, as shown by an open guage,—the barometer at same time reading 30·5 inches,—its specific gravity being known to be 0·450 at a temperature of 60° Fahr., under a pressure of 30 inches of mercury.

For the solution of this question, we use formula [20], observing that we have—computing p_1 and p from [3] and [4]—

$d_1 = 0\ 450$ $t_1 = 60$, $p_1 = 0{\cdot}49\times 30 = 14{\cdot}7$ lbs;

Also, $t = 25°$, $p = 0{\cdot}49\times 30{\cdot}5 + 0{\cdot}036\times 2 = 14\ 95 + 0{\cdot}07 = 15{\cdot}02$ lbs.;

hence the formula gives the density, or specific gravity,

$$d = 15{\cdot}02 \times \frac{0{\cdot}450}{14{\cdot}7} \times \frac{458+60}{458+25} = \frac{15{\cdot}02\times 0{\cdot}450\times 518}{14{\cdot}07\times 483} =$$

$$= 0{\cdot}493.$$

Example IV.—A discharge of air takes place from a reservoir into the atmosphere, the barometric tension of the latter being represented by 29·6 inches of mercury. Supposing the temperature of the air in the reservoir to be 92° Fahr., and the pressure to correspond to 7 inches of mercury, as shown by a guage open to the atmosphere, what would be the temperature of the discharging air?

We shall first compute the ratio of the densities by [27], although we might readily combine this equation with [28] [29], and at once obtain the required temperature. Observing that the given data are

$$p_1 = 29{\cdot}6 + 7 = 36{\cdot}6,\ p = 29{\cdot}6,$$

and [27] becomes by logarithms

$$\log.\left(\frac{d}{d_1}\right) = \frac{1}{1\,4}\ [\log. 29{\cdot}6 - \log. 36{\cdot}6]$$

$$= \frac{1{\cdot}4712917 - 1{\cdot}56334811}{1{\cdot}4} = -0{\cdot}065950 = \log.\frac{1}{1{\cdot}164};$$

hence, by inversion, we have, in numbers

$$\frac{d_1}{d} = 1{\cdot}164.$$

We have next to use [29]. Observing that we have the datum $t_1 = 92$, and taking the logarithms of the first term of the second member of [29], we have

$$\log.(458+t) + 0{\cdot}4\ \log.\left(\frac{d}{d_1}\right) =$$

$$\log. 550 + 0{\cdot}4\ (-0{\cdot}06595) =$$

$$2{\cdot}7403627 - 0{\cdot}026380 = 2{\cdot}713982 = \log. 517{\cdot}59;$$

hence

$$t = 517{\cdot}59 - 458 = 59°{\cdot}6 \text{ Fahr.}$$

In the preceding articles the attempt has been made to bring into view, as clearly and intelligibly as seemed to be practicable, those fundamental ideas of the equilibrium of Fluids, which are essential to a proper understanding of the main subject of these papers; namely, the motion of Gaseous Fluids in its relations to the professional experience of the engineer.

But in entering upon the second division of our subject, it must be premised that there are certain ideas of a *dynamical* kind which enter so generally into the various questions of motion, as to make it expedient to devote a little attention to their previous consideration. These are, *the measure of the force of gravity, the laws of falling bodies*, and *the computation of the work of forces.*

THE MEASURE OF THE FORCE OF GRAVITY.

27. The force of gravity plays a part more or less important in the motions of all bodies, whether solid or fluid. In many cases it is the sole cause of motion, as in the descent of bodies from higher to lower levels; in others, if not the sole motive cause, it at least exerts a modifying influence upon the motion.

The effect of the force of gravity upon a body is measured in two ways, first, by the pressure or *weight* of the body when supported; secondly, by the *velocity added during each second* to the motion of the body falling vertically downwards. The last, which may be regarded as the dynamic measure of the force, is called the *gravity acceleration* of the body, and is practically constant for any given vertical. It, however, varies slightly at different latitudes, increasing from the equator, where it is a minimum, towards the poles, where it is a maximum. From the discussion of numerous observations made at various points on the surface of the earth, it has been concluded that the gravity acceleration, while very nearly 32·10 feet per second at the equator, is very nearly 32·26 per second at the poles. For the latitude of the city of New York, the gravity acceleration becomes 32·167 feet; or placing g for the gravity acceleration, we may take

[30] $g = 32{\cdot}167$ or 32 1-6 feet per second,

as a value sufficiently exact to meet the ordinary requirements of practice, for the various latitudes of the United States and the Canadas.

THE LAWS OF FALLING BODIES.

28. Now, by gravity acceleration we mean the additional velocity gained by a falling body during each second of time. Hence the total or actual velocity which such a body has at any instant, is equal to the product of the gravity acceleration by the *time* in seconds from the beginning of the descent to the instant considered. That is, placing T for the time, and v for the actual velocity, we shall have

[31] $v = g\,T = 32\ 1\text{-}6\ T;$

from which it is seen that the *velocity varies simply as the time*, which is the first law of falling bodies. Thus, at the termination of 1″ 2″ 3″ 4″, etc., we shall have for the corresponding velocities the numbers, 32 1-6th feet, 64 1-3 feet, 96½ feet, 128 2-3 feet, etc.

Again, the height of descent, or space fallen through, is evidently proportional to the product of the velocity and time; but since the former increases unif rmly, in accordance with the law already shown, it follows that the height or space may be represented by the *area of a right triangle*, whose vertical side represents the time, and horizontal side the velocity, of the falling body; whence

$$\textit{height of descent} = \frac{\textit{velocity} \times \textit{time}}{2};$$

or, placing H for the height, we have

[32] $H = \frac{1}{2}\,v\ T = \frac{1}{2}\,g\ T^2 = 16\ 1\text{-}12\ T^2,$

by substituting for v its value from [31]. Hence the *height varies as the square of the time*, which is the second law of falling bodies.

If we square [31], we have

$$v^2 = g^2\ T^2,$$

and equating the values of T^2 in this and the preceding equation, we have

$$T^2 = \frac{v^2}{g^2} = \frac{2\,H}{g},$$

from which we have the following useful formulas:

[33]
$$\begin{cases} v^2 = 2\,g\,H = 64{\cdot}33\,H, \\ H = \dfrac{v^2}{2\,g} = 0{\cdot}0155\,v^2, \\ v = \sqrt{2\,g\,H} = 8{\cdot}025\,\sqrt{H}. \end{cases}$$

The second of these formulas expresses the height of fall at the instant when the body has acquired the velocity v. This height, expressed in terms of the velocity, we shall call the *velocity height*, which will frequently be referred to hereafter.

No allusion has been made to the influence of *atmospheric resistance* upon the motion of a falling body; nor is it necessary for our present purpose to introduce this consideration. The laws here given are those of falling bodies under the sole action of the force of gravity.

COMPUTATION OF THE WORK OF FORCES.

29. If a certain resistance be continually overcome during motion, *work* may be said to be done, and this work is proportional to the space moved over, and the force overcome. There may be two cases; first, where the resistance remains constantly the same; secondly, where the resistance varies, either regularly or irregularly, throughout the motion.

Thus, when we raise a weight through a certain height, we have an example of work in the first case, the expression for which is

$$\textit{Work} = \textit{weight} + \textit{height};$$

or, placing W for the weight, H for the height, and U for the work, we have

[34] $U = W\,H$ *lbs. feet,*

in which the *unit of work* is a *pound-foot*. In general, for any constant resistance R through a space s, we have the work

[35] $U = R\,s,$

in which the unit of work may be a pound-foot, or a product of some other units of force and distance—such as may be employed in the measure of the force and distance. It is evident that the work in these illustrations of the first case, may be represented by the *area of a rectangle*, having the force represented by one side, and the distance by the other.

Again, when we compress a spring, or move a carriage over a road, we have an example of work in the second case, the compressing of the spring giving rise to a regularly varying resistance, and the moving of the carriage to an irregularly varying one. In either case, we may represent the work by the *area of a surface*, a straight side or base of which representing the distances passed over, and the opposite side, as a curved or waving line if necessary, representing the law of the varying resistance. The perpendicular distance from any point of the curved line to the opposite side, or base, being made to represent the resistance at the corresponding point in the distance, it is easy to see that any possible law of resistance can thus be represented, and the work obtained, by merely computing the area of the resulting surface.

There is a relation of works deducible from the second of [33], which we shall have occasion to recognize hereafter. If we multiply both members of this equation by W, we shall have

[36] $W\,H = W \cdot \frac{v^2}{2\,g} = U,$

which, by comparison with [34] is seen to furnish two different expressions of work—the former in terms of the height though which a body may be raised, the latter in terms of the velocity acquired by the body after falling through the same height. The first member may be said to represent *expended work*, the second member *accumulated work*; and although equal in amount, the distinction between them is real and important. To illustrate this distinction, let us suppose a weight, W, to be raised a height, H—the work is expressed by $W.H$; if now the weight be set free, and allowed to fall back through the same height, it acquires a certain velocity, v, whose relation to H is expressed in the second of [33]; this, however, is not all, for it acquires a *capacity to do work* expressed by the second member of [36], equal in amount to that expended in previously raising the weight. And this is as it should be, since, during the descent, the force of gravity represented by the weight being continually in action, there should be an amount of work *stored up*, or accumulated in the weight, equal to the effect of this action. A practical illustration of these relations is seen where a body, rolling down a given slope, accumulates sufficient work to enable it, when fully expended, to roll up an opposite slope to an equal height, the influence of friction and other disturbing causes being neglected.

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ISSUED MONTHLY.

FRIDAY, JUNE 1, 1860.

This number completes the first year's issue of THE AMERICAN GAS-LIGHT JOURNAL. The first number of the second year will appear on the first day of July next, after which the JOURNAL will be published fortnightly, viz.: on the 1st and 15th of every month, each number being of sixteen pages, making a total monthly issue of thirty-two pages, instead of twenty-four as heretofore. Any addition to this will depend upon the requirements of our advertisers.

We are favored with a polite letter from Mr. RUDOLPH OLDENBOURG, proprietor of *Die Journal Für Gasbeleuchtung*, offering us the entire files of his valuable paper from the commencement, and a permanent exchange, which we gladly accept. We perceive, from his correspondence, that MR. OLDENBOURG is a proficient in the American language; we are, therefore, relieved from attempting the an astasis of our defunct German rudiments.

The Controversy between the People of the State of New York (not one of whom knows anything about it), and the METROPOLITAN GAS-LIGHT COMPANY, as to the validity of the Act of Incorporation of the latter, progresses, as will be seen by our report of the legal proceedings in the case.

Speculation in the Natural-Oil Wells of Pennsylvania appears to be a slippery business just now, the last reports from those classic regions (of modern Grease) being, that the unctuous treasures do not ooze as freely from their lowly beds as they did of yore. We always thought there was a little of the *genus* Oily Gammon in this crowd.

The City of New York will come out in our next issue for proposals for one thousand public lamps and lamp-posts and other *materiel*, in the course of the summer. Our iron friends must be on the *qui vive*, and watch the columns of the JOURNAL closely.

MR. S. GARDINER, JR., has removed his electric apparatus to the rooms of THE AMERICAN GAS-LIGHT JOURNAL, and while sitting at his desk lights up our chandeliers in a wink, and then, at his pleasure plunges us into utter darkness. At our request, the city has placed a lamp-post on the South-east corner of Broadway and Canal street, which MR. GARDINER is fitting up with an elegant lantern, which he will light and extinguish, by his battery at our rooms, and we shall soon see whether GARDINER'S apparatus is practicable for city lamps in extended districts.

Mr. J. G. LEFFINGWELL, of St. Louis, Mo., has also removed his celebrated Gas-Regulators to these rooms, and is fitting up a gallery of burners for displaying them. Mr. LEFFINGWELL has a large number of agents employed in selling his Regulators and is doing an extensive and profitable business in them.

MR. WILLIAM E. RIDER announces his beautiful Paraffine Candles in our issue of to-day. They are manufactured under MEUCCI'S patent, and are distinguishable from the worthless imitations that are offered, by the trade-mark to which we direct the especial attention of readers. The firmness, purity of color, and richness of light given by these candles are a rare combination.

Dr. CHAS. M. WETHERILL'S paper on the Relative Value of Illuminating Material, in our last number, has excited much interest. The conclusion of it appears in this number, and we are having it reprinted in pamphlet form, with a few *errata* that were in it, corrected.

Mr. JOHN P. KENNEDY'S patent yoke for attaching the mouth-piece to Clay Retorts, is advertised in this number, and will attract attention. It is a "consummation most devoutly to be wished" by the advocates of Clay Retorts, and effectually removes the hitherto insuperable difficulty of bolting. It is a good thing, if Mr. KENNEDY *is a* Jersey-man.

Mr. GEORGE WALCOTT, of 24 Abchurch Lane, London, advertises on our last page, the sale of a patent or cheap and expeditious gas-making, which some of our enterprising gas-makers should look into.

Mr. CHARLES WOOSTER offers in our columns his portable gas-apparatus, under COATES' patent, a simple and convenient way of making one's own gas on the premises, becoming now so fashionable an amusement. Mr. WOOSTER has removed to these rooms for the sale of his apparatus.

THE NEW YORK CAR AND STEAMBOAT GAS-COMPANY are prepared, as their advertisement indicates, to supply cars, steamboats, private houses in town or country, hotels, private and public carriages, &c., with TANKS OF GAS for temporary use. This is a new feature, and an admirable one, too. Their apparatus is put up in one corner of thees rooms, and we invite an examination of it by all interested.

Inventors have responded with unexpected alacrity to our notice of the opening of a Patent Agency, under the charge of Mr. F. C. TREADWELL, JR., whose reputation as a careful and successful patent agent is so widely established. All business intrusted to these rooms, whether of new inventions, renewals, or rejected, or interference cases, will receive Mr. TREADWELL'S personal care and attention.

OBSERVATOR is welcome again, and his communication will interest many of our readers. Mr. GEO. ANDERSON, of London, criticised the previous communication of OBSERVATOR, who will, doubtless, have something to say in reply.

GLENMORE is at his post again, to the gratification of many friends, and PLATINUM presents an interesting paper on the chemistry of coal-decomposition.

Our regular semi-annual tables of Gas-Companies will appear in the next number, and we will thank the various secretaries to send in their last annual reports immediately.

It is the opinion of some Engineers that the proposed Gas Congress, should be held in August, others name September, as the least busy month, while Mr. BRICK and others think October the most convenient and agreeable in temperature. We would thank the various companies throughout the United States to send in their votes as to which month will be best. We will publish the result, and the majority will rule.

We are, at length, in possession of the building adjoining the corner of Elm street, and have connected the two by an arch, so that our rooms now *present a front of fifty feet on Canal street, by nearly one hundred feet in depth.* They are rapidly filling up with interesting apparatus and inventions of all sorts. Hundreds of visitors lounge about them, burning gas in every conceivable shape, from a Scotch-tip to a blow-pipe. We, again repeat, that the rooms of THE AMERICAN GAS-LIGHT JOURNAL are OPEN AND FREE TO ALL, and they may stroll about, burn and talk gas, and blow their own or our pipes to their hearts content, and "no questions asked."

The Coal-Oil interest is represented in great numbers among our daily visitors, and the universal expression of pleasure at our recognition of its importance is gratifying. A marked addition to our subscriptions and advertisements has resulted from this step.

The advocates of Burning-Fluid contend that that material has as much claim upon the columns of this JOURNAL as Coal-oils, its consumption being large and increasing, in districts where gas has not yet been introduced. We grant the soundness of the argument, and are willing to admit communications and advertisements of this department of light with the understanding that we shall not be considered as advocating its use, but on the contrary, that we pronounce it highly dangerous, excepting where means for burning it have been invented that will guarantee its safety. We shall continue to record accidents resulting from it, as we do of explosions of gas, and other casualties.

If the citizens of any town in which Gas-Works are wanted, or would pay, will write us, we will make it known through our columns, and works will soon be erected by some of our enterprising gas-work builders.

Mr. O. F. WINCHESTER'S letter on the New-Haven Gas Controversy, will be generally read. We have defined our position hitherto, but we again wish it to be distinctly understood, that the position of the AMERICAN GAS-LIGHT JOURNAL on this and all other subjects is one of entire neutrality and independence. It is not our province to discourage enterprise in any quarter; on the contrary, it is our earnest effort to encourage and promote it. As far as the pecuniary result would affect us, we might be glad to have a gas company in every street of every city in the Union; but it is a question to be decided what would be their effect upon each other and upon communities. MR. WINCHESTER'S inference of our committal to any particular gas companies is gratuitous. None have asked for it; we doubt if any care for it. We will reserve our answer to any offers until we receive them.

The advice to subscribe to the AMERICAN GAS-LIGHT JOURNAL, on which our correspondent lays stress, we believe to be sound and wholesome, as well for Gas Companies as for stockholders and the general public; and our opinion on this subject having been entirely confirmed by these various classes, we do not propose to retract it until we have reason to question its wisdom.

GLENMORE, N. Y., SCHOOL OF ENGINEERS.

This institution was opened in the autumn of 1859, under the directorship of Professor B. FRANKLIN GREENE, the able contributor to the AMERICAN GAS-LIGHT JOURNAL, over the signature of Glenmore. The purpose of this institution is at once that of a School of Science and a Home for its students, separated from the disturbing influences of town life. Glenmore is a beautiful farm of eighty acres, situated on a ravine-formed promontory of the east bank of the Hudson River, equally distant from the cities of Albany and Troy in this State. Its position is at once commanding and secluded, and while amidst surroundings eminently rural and picturesque, it is within reach of a remarkable assemblage of objects of scientific and technical interest. The objects of the institution are to provide liberal culture and thorough training in Theoretical and Practical science, including the education of ENGINEERS in respect to the specialties of *Topography and the higher Geodesy, Roads, Bridges, Hydraulic and Pneumatic Works, Machines and Prime Movers.* The expenses of the school are light; the attention to their physi-

cal, moral, and intellectual training will, we are sure, be most conscientious on the part of the director, whose social and scientific position are second to none in the State, as his abundant references testify. We cordially reccommend those having youth to be educated, to communicate with Professor GREENE, whose post-office address is Glenmore, near Troy, N. Y.

OUR PROGRAMME FOR 1860-'61.

From and after this date, THE AMERICAN GAS-LIGHT JOURNAL is a semi-monthly paper. The first number of its second year will be issued on July 1st, the next number July 15th, and so on, throughout the year. This reduces the price virtually one-half, and we may make a further reduction when age shall have strengthened the little bantling's legs in the calf, a little more. Our London contemporary remarked of us a few months since, that "while Gas Companies are limited to local districts, his (our) district is the whole world." This is true, and shows a candor and appreciation too unfrequently exhibited, we regret to say, in rival papers.

Our earnest desire and firm intention are, to make THE AMERICAN GAS-LIGHT JOURNAL *the very best and cheapest paper of its class in the world.* To accomplish this it must circulate among the masses; and, we believe, the day is not far distant, when it will be in the hands of thousands, to whom the blessings of good light, pure water, and efficient sanitary protection are now denied. Ignore the fact as we may, it is to these important classes that all great enterprises must look for thorough development and successful issues.

In order to command this extensive circulation, and to make known throughout the length and breadth of this vast Continent what is being done in the procurement of good Light and pure Water, we have already supplied the Presidential post-offices with thousands of copies of the AMERICAN GAS-LIGHT JOURNAL. We shall begin with the first number of the new year (July 1st,) *and supply the balance of the thirty thousand post-offices in this country, with copies of this* JOURNAL, *a certain number each month,* UNTIL THE WHOLE AMERICAN UNION IS AROUSED TO THE IMPORTANCE OF OUR ENTERPRISE. *The benefit of this enormous circulation to our advertisers cannot fail to be appreciated,* as the total number thus circulated, allowing an average of one hundred to each post-office, will not probably fall short when the distribution shall have been completed, of THREE MILLIONS OF COPIES.

TO OUR FRIENDS IN GREAT BRITAIN.

The AMERICAN GAS-LIGHT JOURNAL will be issued hereafter on the 1st and 15th of every month. The subscription price is also reduced to TWELVE SHILLINGS sterling per annum, payable in all cases in advance. Post-office orders can be remitted to our bankers in London, Messrs. WHEATLEY, STARR & Co., No. 74 King William street, to whom please also send the full address to which the JOURNAL is to be sent. We have received payment for several subscriptions in Great Britain, for which we cannot send the JOURNAL because the addresses were not given.

TO SUBSCRIBERS AND ADVERTISERS.

Our Subscribers will remit, on receipt of this number, for as many copies of the JOURNAL as they wish, during the coming year. The greater our circulation, the greater are our means of improving the JOURNAL; and we anticipate a large increase over the circulation of the past year, liberal as that was.

Advertisers will be charged for the double issue but a slight advance upon the previous rates, and they will please take notice of our Programme for 1860-'61, in this column.

TO THE BRITISH WATER COMPANIES.

We are now devoting our energies to procuring complete and correct information respecting the Water-Works of the World. In doing this, we shall not be content with the mere list of names and amount of their respective capitals. We wish to know all important details, the extent of the works, their cost, revenues, expenses, mode of charge, population, and number of water-takers. The American Water Companies have responded promptly to our questions, and sent us piles of printed reports, of which we hope to present tables in the course of July or August. We hope that European, and especially the British Water Compânies, will do the same on receipt of this request. Several of them have already done so of their own volition, for which we thank them. The papers on Water-Supply which have appeared from time to time in the AMERICAN GAS-LIGHT JOURNAL, will be continued regularly hereafter. Please address all letters and pamphlets to the AMERICAN GAS-LIGHT JOURNAL, New-York City, and they will be sure to find us.

COMPETING GAS COMPANIES.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

The well-timed letter of your correspondent, C. R., was equally well-placed in the columns of your valuable JOURNAL. If anything more were wanting to strike the death-note of the most thorough monopolies in the country, it was the doleful lines which the writer of that letter penned.

When the threatening attitudue of the rebellious colonist was rung in the ears of G. R. (GEO. III. REX), he called them rebels, and ordered them to be shot. In the same strain the autocrat of the gas-monopoly, C. R. (CHARLES I. REX), brands the "adventurers," who dare to question his supremacy—"outlaws," and threatens them with annihilation. The gods made G. R. mad, and destroyed him. How is it with C. R.? I think the least said on this subject by that gentleman the better, until the present persecution of a legally chartered company in this district is decided. You may, then, hear again from this other

SEER.

NEW YORK, May 28, 1860.

YOUNG'S DISCOVERY OF COAL-OIL.

The infringement of Young's process for the manufacture of paraffine oil from coal has already given rise in this country to considerable litigation, and as the controversy bids fair to occupy our courts for some years to come. it has occurred to us that any facts bearing on the inception and progress of this invaluable discovery might prove interesting not only to the parties engaged in this branch of manufacture but to our readers generally.

About the year 1848 the celebrated chemist, Dr. Lyon Playfair, who was professionally engaged in connection with the Geological Survey of Great Britain, and at that time resided in London, informed Mr. Young that a spring of petroleum had made its appearance in a coal mine belonging to his brother-in-law, a Mr. Oakes, of Reddings Hall, in Derbyshire, and suggested that Mr. Young should examine the oil and see what could be done to turn it to account.

Mr. Young, accordingly, proceeded into Derbyshire and met Dr. Playfair at Mr. Oakes' residence. After some days spent in examining the geological formations in the vicinity of the spring, he collected samples of the petroleum and took them away with him for the purpose of analysis and experiment, having previously arranged with Dr. Playfair and his brother-in-law that he should give the whole subject very careful attention with the view if possible, of utilizing the petroleum. The result was the production of a valuable burning oil and a lubricating oil

It was while working upon this petroleum, and studying its nature, that Mr. Young first conceived the idea that a similar description of oil could be produced artificially from coal, and after having instituted a series of experiments for the purpose of testing the correctness of his theory, he succeeded in obtaining a similar product from certain descriptions of coals, and in such quantities as satisfied him would enable the discovery to become commercially useful. He soon after applied for and took out letters patent for Great Britain and the Colonies.

He found the coals that answered best to be those which produced the largest amount of illuminating gas, as he satisfied himself that the oil or paraffine was merely olefiant gas in another form.

GAS CONSUMERS' MANUAL.—By T. L. Marriott, Solicitor and Parliamentary Agent, London. We have received a number of copies of this valuable little work, which, although entirely local in its nature, will serve to fill a niche in the American Gas Engineers' library.

PERSONAL.

The Rooms of the AMERICAN GAS-LIGHT JOURNAL are visited daily by our own most eminent and intelligent citizens, and of course by all interested in Light, Water-supply and Sewerage, from other places.

Among those who have favored us with a call recently are Mr. J. M. Walker, President of St. John N. B., Gas-Works, and Mr. Archibald Rowan, an intelligent gas-fitter of the same town; Dr. Antisell, of the U. S. Patent Office, Washington, D. C.; the engineers of the Marysville and Sacramento, Cal., Gas-Works, whose names we did not obtain owing, to our being engaged at the time; Hon. Neal Dow, President of the Portland, Me., Gas-Works; Chas. Roome of the Manhattan, and W. W. Fox of the New-York Gas-Light Co.; Gen'l O'Donnell, and J. Mowton Saunders, of the Baltimore Works; P A. Sabbaton, of the Albany Works; Jas. B. Bake. o the Worcester, Mass.: O. G. Steele, of Buffalo; J. W. Smith, of Alexandria, Va.; Burr Wakeman, of Harlem, N. Y.; Sam'l R. Brick, of Philadelphia; Thos. R Dutton, of Hartford, Ct.; Jas. Cleland, Lynchburg, Va.; W. C. Taber, and W. T. Howland, of New Bedford, Mass.; James Hoy, of the Metropolitan, N. Y.; Professor B. Silliman, Jr., of New Haven, Ct.; Henry Bull and J. N. Stanley, of Newport, R. I.; B. M. Douglass, of Norwich, Ct.; J. F. Hunt, of Scranton, Pa.; W. H. Barlow, of Sing Sing, N. Y.; Geo. Dwight, of Springfield, Mass.; E. Guy, of Stamford, Ct.; J. R. Thomas, of Willamsburgh, N. Y.; James K. Brick, of Brooklyn, N. Y.; Messrs. Libby. Stebbins & Bloodgood, of the Citizens, (opposition) Brooklyn. N.Y.; A. Hart, of the Water Gas-Company, Philadelphia; John F. Harrison, of Havana, Cuba, Gas-Works; Judge Davies, of the Court of Appeals; Very Rev. Bishop Bayley of Newark, N. J. Mr. Orne, of Boston, Mass., inventor of an admirable gas burner, *stuffed with sawdust!* (the burner, not the inventor) Messrs. Yoe and Burtis of the Chicago, Ill., Gas-Works; Mr. Joseph Battin, of the Newark, N. J., Gas-Works, and many others.

We shall have a visit from the Japanese pig-tails. if there is anything left of them after the New York aldermen get through with them. The aldermen used up the Turk, but they may find fifty Japanese a harder nut to crack.

Mr. John Jeffrey, of Cincinnati, O., did us the favor to call here in March, and we understand he has lately secured the services of Mr. Robert Price junior, educated by Mr. Alfred King, of the United Gas-Works, Liverpool, as draughtsman and assistant engineer. We hear Mr. Price well spoken of in Cincinnati, and think he is destined to rank high in his profession.

James Young, Esq., of Glasgow, Scotland, the veteran manufacturer of coal-oils, recently on a visit to this country, made the tour of the Western States, and called upon us last month, on his way home. He sailed on the 9th of May.

Mr. John A. Cowen, of Newcastle, Eng., returned from an extended tour in the Southern and Western States. early in May, and is now at the East. He will sail from Boston in the Arabia on the 15th this month.

BOGUS GAS COMPANIES.

The detective police called upon us a few days since to exhibit a huge book of certificates of shares of THE NEW YORK GAS COMPANY, which had been ordered of Robertson & Co. lithographers, in Fulton street, by some graceless scamp, with the intent, doubtless, of palming them off as the shares of the old New-York Gas-Light Comt pany. Two parties, who were evidently concerned in the swindle, denied the soft impeachment on finding the police mixed up in the matter, and the lithographer is, forced, by the volatile nature of his customers, to whistle to the winds for his money, they having vanished into thin air, or something worse.

PIQUA, O.—These are called Model Works, and were built by Robt. T. Coverdale. Use iron retorts, made at the Columbus, O., Machine Shop; Jones' station meter, Gratz's customer meters. George Stacy, of Cinn., built the gas holder. Use the Youghioghenny coal (we always stumble over that name) at 15½cts. per bush., which they think, makes better coke, better gas, takes less lime, and saves, generally, 15 @ 20 per cent.

ELIZABETH, N. J.—This lively little company has improved materially since January. It now divides 4 per cent. semi-annually, has increased 50 consumers, 4 public lamps, and decreased the price of gas ten per cent. This company knows how to prosper.

GAS-LIGHT IN R. R. CARS.—The Pennsylvania Railroad Company have lighted one of their cars with gas, and are preparing to introduce it generally in their cars.

ROCHESTER, N Y.—The price of gas is reduced from $3 to $2.50, to take effect this day.

ON THE CHEMISTRY OF COAL DECOMPOSITION IN HEATED RETORTS.

It may not always be within his power, if it becomes the inclination of the gas engineer, to reach the high standard which theory indicates; but it is always well that the completeness of a chemical process should be shown, so that every one may be aware of his shortcomings in his daily occupations.

"The introduction of Clay Retorts we therefore regard as the commencement of a new era in the history of gas-making," a remark the truthfulness of which experience will not be long in demonstrating.

The production of gas from coal is founded on the decomposition of a solid by heat *suddenly applied* to the coal; and it is essential that the temperature shall be higher than that of visible redness, and continued until the volatile portions have been transformed into gas and vapors.

When coal is slowly heated, it is well known that if the heat be maintained uniform, at about the lowest point of decomposition, little gas and much oil are formed, and while the gas manufacturer keeps his apparatus at a uniformly high heat, the oil manufacturer maintains with great care the lowest heat inducing chemical reactions among the coal elements; strictly speaking, therefore, the two arts are distinct; the gas manufacturer should produce gas, watery vapor, acids, light etherial oils, but no heavy fluid products; while the oil manufacturer should allow none of his oils to form gas, and produce only heavy and light fluids. In both these arts, much of success depends on the form and material of the apparatus employed. The production of gas requiring a high and sustained heat, calls for a resisting material which can endure many months firing, so massive in size that it cannot be much reduced in temperature by the introduction of fresh coal, and of such form as combines a large heated surface with convenience in use. The only material which is naturally adapted to construction of vessels for coal decomposition is the ware formed from resisting clays; and if early practice with vessels of iron can be adduced in favor of this latter material, it must be remembered that such vessels were generally little more than the interior lining of fire-brick structures, and did not fulfil the conditions of good decomposing vessels, in consequence of the ease with which fresh coal or cold air robbed them of their heat. Removed from connection with their fire-brick surroundings, there are few engineers who would give them a trial; while the clay vessels can alone, and without massive structures, serve as the means of resolving coal into gas and coke continuously.

Adopting clay compositions as the material, and keeping in view the required conditions in producing gas, it may not be uninteresting to enter upon the extended field of investigation, which the *form* of the vessel has opened.

It is no part of my purpose to present a history of gas-retort inventions, as it can be found in part in every standard work, and more fully set forth in Patent Reports. That a great number of forms have been contrived and used, and that many of these have been better forms than those earlier adopted, is sufficient for my present purpose. The fact that one form of retort produces more and better gas from a given amount of coal, needs only to be stated, and it becomes accepted as well known to all. If a retort of a certain form produces more and better gas than a retort of another form, the effect must be owing to a diminution in the quantity of condensible fluid products, the amount of coke remaining the same always. Again: If a given form of retort produces more and better gas than another from the same weight of coal, it must approach in its action more closely to what is necessary in fulfilling the requirement of the engineer in so far as breaking up the volatile portion of coal into gas, without heavy fluids, is in point.

It has been assumed by writers that the production of tarry fluids is a necessary concomitant of coal decomposition, and that this so called mass of impurities enables the manufacturer to obtain a more pure gas, in consequence of their withdrawal by condensation.

The groundlessness of such an assumption is seen at once when we find the manufacturer of coal-tar products obtaining illuminating materials in quantity from the tar, resolving it into lighter and heavier bodies as the oil manufacturer does coal; demonstrating, in fact, that it is a portion of volatile, coally matter, which has escaped the process of the gas manufacturer.

Turning to the operation of the oil manufacturer, we find his crude product, in the steps of the refining process, presents us with no tarry body. Oils and coke alone are found in systematic operations, and a consideration of the completeness of this part of the manufactures from coal leads us to inquire more particularly into the conditions under which heavy products are formed in the other branch,—that of gas making.

If coal is dropped into a red hot vessel, having an opening in the upper part, gas and vapors escape freely, and the latter may be condensed as usual to a viscid fluid.

If, however, we would bring the decomposing vessel nearer in its action to the conditions necessary to insure the conversion of coal into gas without vapors, we prevent the escape of both gas and vapor from *above* the coal, and compel the products to escape by the hotter sides of the vessel.

Under the new condition, gas without more than an accidental portion of vapor, forms; the quantity is increased, and the quality is either improved or not impaired; in short the volatile portion of the coal is converted into gas with the aqueous, alkaline and sulphur products, without the formation of tarry matters.

The manufacture of gas can therefore be brought to the state of completeness seen in the manufacture of oils from coal, by a better mode of decomposing coal than that usually adopted.

When we examine an ordinary short retort in action, *two* processes are proceeding within it at the same time. That portion of the coal which reposes on the more highly-heated parts of the retort, is being decomposed into gas quite perfectly; while the portion resting on the part nearer the mouth, and less highly heated, is being distilled to furnish heavy fluid products, which are carried forward by the hot gas passing over and through it.

A common retort is therefore at once a gas generator and an oil producer, and gas and heavy oils are the crude products such an apparatus affords. It is true that if a retort is quite uniformly heated, and the coal, as charged in occupies only the more highly-heated part, the gas escaping is less highly charged with heavy oils or tar. A knowledge of this fact, instead of continuing the use of such retorts, should lead to the adoption of forms which permit the volatile part of the coal to be converted more closely into the theoretical products.

It is easier to demonstrate that coal can be thus decomposed than to suggest the form of apparatus which will serve continuously on the large scale of manufacture.

The principle of construction is that of taking away the gas from the hotter parts of the retort, never permitting it to pass through the cooler portion of coal, and to provide against refrigeration during the process.

In practice it has been found that channels of moderate size, passing from the hotter part of the iron retort where they are open, and communicating with the stand-pipe, permit this more complete action; and in small works such retorts have improved the manufacture of gas in every respect. Excepting the risk of closing the channels, and the additional labor of attending them, improved retorts would advance the manufacture.

The introduction of fire-clay as the material for retorts permits modifications of form, in which the principle of passing the gas directly after it is formed in the hotter part of the retort to the stand-pipe can be applied, and the retort made a decomposing, rather than, in part, a distilling vessel.

We possess coals which afford rich gas at a low cost from retorts acting on this principle, and there is hardly a locality where economical advantages would not attend the application of such retorts. PLATINUM.

GAS-LIGHTING IN ENGLAND.

The lighting by gas of the several districts of the city of London is supplied by the combined action of thirteen companies, by means of twenty-three gas establishments, and six stations or depôts containing only gasometers.

The length of the pipes and mains for the distribution of gas is not less than sixteen miles—about 257,500 yards; the diameter of the pipes averages five inches or thereabouts. The sum total of burners for the lighting of the streets is 37,728, placed at a distance from each other, averaging sixty-eight yards.

The companies supply two sorts of gas—cannel gas at the rate of $1.56 and the ordinary coal-gas at the rate of $1.08 for a thousand cubic feet.

The cannel gas possesses lighting properties equal to twenty-four or twenty-six sperm candles for a consumption of three cubic feet, whereas, the lighting power of the common coal-gas is only equal to twelve or fourteen candles for a like quantity of gas.—*Le Journal de l'Eclairage au Gaz.*

TRIAL OF PARAFFINE LUBRICATING OIL.

By W. B. Leonard, Esq., Secretary to the American Institute, on his patent Dynamometer for Testing Oils.

Revolutions.	Pure Sperm Oil. Power exhausted.	Paraffine Oil. Power exhausted.	In favor of Paraffine.
500	2	1·	100 per ct.
1000	4	2	100 "
1500	6¼	6¼	90 "
2000 Practical point of oiling	9¼	5	90 "
2500	13	7	85 "
3000 Sperm entirely exhausted	17½	10	75 "
3500 Paraffine entirely exhausted	14..		500 more revolutions and 25 per ct. less exhausted than the Sperm.

CERTIFICATE.—I hereby certify that the above is a true copy of a trial of Paraffine Oil manufactured by the Union Coal and Oil Company, of Maysville, Ky., as tried on my Patent Dynamometer, on the 20th day of September, 1858, showing that the said Paraffine Oil contains 75 per cent. more lubricating properties than pure Summer Strained Sperm Oil. (Signed) W. B. LEONARD.

PARAFFINE.

At a Curler's dinner, given lately, by Mr. E. Meldrum, Bathgate Secret Work, Mr. T. W. Weir, of Boghead, in proposing the health of Mr. Meldrum, said: "You are all aware that Mr. Meldrum and his partner, Mr. Young, have extracted from the Boghead parrot coal, now designated the disputed mineral, an oil which, in color, vies with the finest sherry or the purest amber, and in brilliancy is not so much inferior to gas, and in my opinion is less offensive to the sight. In an economical point of view, it has not its equal. It, therefore, like the sun in its meridian splendor, is destined to illuminate the inhabitants of every nation upon the earth. By his scientific skill, and by dint of the most indomitable perseverance, Mr. Meldrum has also discovered in the same mineral a substance named paraffine, which is now employed as a substitute for wax in the manufacture of candles. In color, it vies with the most precious opal, and in purity with the newly fallen snow. It emits a light more brilliant than that of wax, and is now used in the mansions of the nobility in London, and will, ere long, illumine the drawing-room of our Queen. In price, it is cheaper than the finest wax lights. From the same unparalleled mineral, most astounding to announce, he has likewise extracted chloroform, and the purest spirits, both of which I have had the felicity of testing.—*Glasgow Herald*, 27th April.

EXPERIMENTS ON THE CALORIFIC VALUE OF GASES UNDER DIFFERENT SPECIFIC GRAVITIES.

There is, perhaps, no science at the present day more fully investigated, nor its principles more correctly applied and practically illustrated, than that presented to us under the progress of gas-lighting. Such, indeed, is now the general diffusion of correct knowledge on everything relating to manufacture and supply, that its adoption in every town, village and hamlet, both in this country and America, is becoming universal; but this universality of its introduction for lighting purposes is not its only advantage; the facility it affords as a *fuel*, conveniently and readily applied, is gradually leading to its introduction and use in various domestic purposes of every day life.

There are yet comparatively few experiments upon the heating power of gas. It is reported in the *Journal of Gas-Lighting*, vol. i., page 327, that the mean of several experiments made by Mr. G. H. Palmer, gave "20,000 cubic feet of air, raised 1° by the combustion of 1 cubic foot of gas." But as the heat required to raise a given quantity of air is to that of water as 3·7 to 1·, and as 12 cubic feet of atmospheric air are equal to 1lb., then $20{,}000 \div 12 = 1666{\cdot}6$ and $1666{\cdot}6 \div 3{\cdot}7 = 450$ units, or 1 lb of water raised 450° by the combustion of 1 cubic foot of gas.

The only other reference I have to make is to a table of four differently constituted gases given by Mr. F. J. Evans of the Chartered Gas-Works, London, and inserted in the *Journal of Gas-Lighting*, vol. ii., page 305, which gives the lbs. of water raised 1° by the combustion of 1 cubic foot of gas. It is to be regretted, however, that much of the interest of those experiments is lost by the entire absence of details; this is the more to be regretted, that the results given approximate more closely to their true values than appear to be realized by the ordinary methods in use.

These, I believe, are the only reliable experiments consistent with my knowledge. And in pursuing this branch of inquiry, it is not my intention to enter into the nature and properties of heat, further than to say that, in all ordinary cases of combustion, the heat evolved is to be referred to the oxidation of the substance, whether in the gaseous or solid state, in its chemical union with the atmosphere. Thus, by the oxidation of 1 lb of iron exposed to the air, the same quantity of heat is liberated as if burned in oxygen gas, the difference being only one of degree in intensity and time. The act of combustion, therefore, is nothing more than the union formed between the combustible and the surrounding oxygen, and the measure of heat liberated will be in proportion to the measure of oxygen combining to form that union.

Different bodies possess different powers of affinity for oxygen. Thus, in the ordinary gas flame, such is the unequal attraction for oxygen, that the hydrogen takes all, and the carbon is consumed in the intensity of its flame, giving rise to the phenomenon of light; but if more air could be introduced into the flame, and its temperature still further elevated, or were the gases mixed with their combining proportions of air previous to combustion, the physical character of the flame is totally altered, the hydrogen and carbon burn together,—the illuminating power is destroyed,—and the quantity of heat materially increased. On this principle the Bunsen burner is constructed, which, with some modifications for regulating the admission of air, I have found the best for heating purposes. *

I will presume it to be understood that the *unit* of *heat* adopted in this country and America, is that quantity which will raise 1 lb *of water* 1° Fahrenheit. Thus, to raise 2 lb of water 180° requires (180×2) 360 units, or to raise 45 lb 25° requires (45×25) 1125 units of heat, and the composition of the gases with which we have to deal are—

Olefiant	C 2 H 2	Sp. gr. ·981	w't. of 100 cub. in.	30·57	grains
Light carburetted hydrogen	C 1 H 2	Sp. gr. ·559	" do. "	17·41	"
Carbon vapor	C 1 O 1	Sp. gr. ·416·66	" do. "	12·6083	"
Hydrogen	— —	Sp. gr. ·0693	" do. "	2·14	"

From which we will be able to deduct the theoretical calorific value, and what proportion of that value is realized by experiment and rendered available to a given purpose, as consumed in the Bunsen burner.

1*st*.—Gas produced from the brown variety of the Boghead Cannel coal:

Specific gravity of coal	1·175
Specific gravity of gas	·685
Condensation by Bromine	28·37

Composition.		Weight in grains.	Grains carbon.	Grains hydrogen
Olefiant	28·37	— 8·826	— 7·59	1·236
Carburetted hydrogen	71·13	— 12·384	— 9·34	3·044
	100·	— 21·21	— 16·93	4·28

* This is the principle of Krauss's gas-stoves, which bid fair to supersede all other in use in this country.—ED.

According to the experiments of DESPRETY, the combustion of 1 lb pure carbon will raise 78·15 lb of water from freezing to boiling point. DULONG makes it 73·66; BLACK & THOMPSON, 73·. We shall take the mean 74·94 × 180 is equal to 13,489 units of heat. The combustion of 1 lb pure hydrogen is stated at 62,000 units. Then 16 93÷21·21 = 0·797 and 13489 × 0·797 = 10,764 carbon, & 4 28÷21 21 = 0·2 and 62000 × 0·2 = 12,400 hydrogen. or 23,164 units from 1 lb of gas. And 21·21 : 100 :: 7000 : 33003 ÷ 1728 = 19·1 cubic feet as equal to 1 lb of gas, and 23,164 ÷ 19·1 gives 1213 units due to the combustion of 1 cubic foot.

By experiment, 0·5 cubic foot consumed in the Bunsen burner raised 2 lb of water from 40° to 187° = 147 × 4 gives 1 lb of water raised 588 units by the combustion of 1 cubic foot, and taking the latent heat of steam at 988 units, 588 ÷ 988 = 0·595 lb of water evaporated from 212° or 11·27 lb by the combustion of 1 lb of gas, and taking the calculated value at 1·, the practical results will be 0·485.

2*d*.—From equal quantities of Boghead, black variety, having a specific gravity of 1·197, and Amiston specific gravity 1·201. Specific gravity of gas ·658. Condensation by bromine, 22·75. 0·5 cubic foot raised 2 lb of water from 42° to 189°, and 147 × 4 gives 588 units by the combustion of 1 cubic foot, equivalent to the evaporation of 0·595 lb of water.

By composition.			Weight, grains.	Grains, carbon.	Grains, hydrogen
Oleflant.....	22·75	=	6·955	5·981	0·974
Carburetted hydrogen .	77 25	=	13·449	10·139	3·31
	100·	=	20·404	16·12	4 284

Then 16·12 ÷ 20·404 = 0·79 and 13489 × 0·79 = 10,656 units, and 4·284 ÷ 20·404 = 0·22 and 62000 × 0·22 = 13,640 units, or 24,296 units capable of being liberated by 1 lb of gas, and as 20·404 : 100 :: 7000 : 34307 ÷ 1728 = 19·85 cubit feet to 1 lb; 1 cubic foot, therefore, will give 1224 units, which being taken at 1·, the practical value will be 0·48.

3*d*.—Gas from a bituminous shale, discovered on the coast of Northumberland by the writer. Specific gravity of shale, 1·733; specific gravity of gas, ·650; condensation by bromine, 18·75. 0·5 cubic foot raised 2 lb of water from 44° to 175°, then 131 × 4 gives 1 lb of water raised 524 units by the combustion of 1 cubic foot, being equal to the evaporation 0·5304 lb of water, or 10·782 lb by 1 lb of gas.

By composition,			Weight.	Grains, carbon.	Grains, hydrogen.
Oleflant.	18·75	=	5·732	4·922	0·81
Carburetted hydrogen..	81·25	=	14·146	10·668	3·478
	100·	=	19·878	15·59	4·288

Then 15·59 ÷ 19·878 = 0·78 and 13,489 × 0·78 = 10,521 to carbon, and 4·288 ÷ 19·878 = 0·22 and 62000 × 0·22 = 13640 to hydrogen, or 24.161 units for the combustion of 1 lb of gas, and as 20·33 cubic feet is equal to 1 lb, the heating power of 1 cubic foot will be 1188 units, which taken at 1·, the practical result will be 0·441.

4*th*.—Gas from a mixture of Amiston, Wallyford and Boness coal, in equal quantities. Specific gravity, .595; condensation by bromine, 13·25. 0·5 cubic feet raised 2 lb of water from 42° to 178° = 136 × 4 gives 1 lb of water raised 544 units by 1 cubic foot, equal to the evaporation of 0·55 lb of water, or 11·645 lb. by 1 lb. (21·15 cubic feet) of gas.

By composition.			Weight.	Grains, carbon.	Grains, hydrogen
Oleflant.....	13·25	=	4·05	3·47	0·58
Carburetted hydrogen...	86·75	=	15·1	11·34	3·76
	100·		19·15	14·81	4·34

Then 14·81 ÷ 19·15 = 0·773 and 13489 × 0·773 = 10.427 units, and 4·34 ÷ 19·15 = 0·228 and 62,000 × 0·228 = 14.136 units. 1 lb. of gas, therefore, will be equal to 24,563 units; and as 21·15 cubic feet is equal to 1 lb. 1 cubic foot will be equal to 1114 units, which taken at 1·, the practical results will be 0·488.

5*th*.—To 68 volumns of the above gas—specific gravity 5.95—was added 32 volumns of hydrogen. Sp. g. of the mixed gases, ·440. Condensation of bromine, 7. Its composition may, therefore, be taken as follows:

			Weight.	Grains, carbon.	Grains, hydrogen.
Oleflant.....	7·	=	2·139	1·839	0 30
Carburetted hydrogen ..	61·	=	10·62	8·	2·62
Hydrogen.....	32·	=	0·68	..	0·68
	100·	=	13·439	9·839	3·6

Then 9·839 ÷ 13·439 = 0·73 and 13489 × 0·73 = 9847 carbon, and 3·6 ÷ 13·439 = 0·27 and 62000 × 0·27 = 16740 hydrogen, or 26,587 units by the comoustion of 1 lb of gas; and as 30·14 cubic feet is equal to 1 lb, 1 cubic foot will give 886 units. By experiment 0·5 cubic feet raised 2 lb of water from 45° to 163° = 118 × 4 gives 1 lb of water raised 472 units by 1 cubic foot, being equivalent to the evaporation of 0·478 lb of water, or 14·4 lb by 1 lb of gas. Taking the calculated value at 1·, the practical results will be 0·533.

6*th*.—To 4 volumes of gas—specific gravity ·44.0—was added 6 volumes hydrogen, 6 : 4 :: 100 : 66·66. Condensation by bromine, 3. Calculated specific gravity, ·246. Its Composition may, therefore, be taken as follows:

			Weight.	Grains, carbon.	Grains, hydrogen.
Oleflant	3·	=	0·917	— 0·789	0·128
Carburetted hydrogen. ..	30·34	=	5·282	— 3.982	1·3
Hydrogen	66·66	=	1 427	— ...	1·427
	100·		7·626	4 771	2.855

And 4·771 ÷ 7·626 = 0·635, and 13.489 × 0·635 = 8565 carbon, and 2·855 ÷ 7·626 = 0·374, and 62,000 × 0·374 = 23188 hydrogen, or 31.753 units of heat for the combustion of 1 lb of gas; and as 63·87 cubic feet will be equal to 1 lb, 1 cubic foot will give 497 units.

By experiment 0·5 cubic foot raised 2 lb of water from 46° to 124°; then 78 × 4 gives 312 units for 1 cubic foot, being equivalent to the evaporation of 0·316 lb of water, or 20·17 lb by the combustion of 1 lb of gas. Taking the calculated value at 1·, the practical results will be 0·628.

7*th*.—Hydrogen gas, sp. g. ·0693, 100 cubic inches weigh 2·14 grains, 189 cubic feet will, therefore, be equal to 1 lb, and 62,000 its theoretical value, ÷ 189 gives 328 units for the combustion of 1 cubic foot. By experiment, 0·5 cubic foot raised 2 lb of water 71°, which × 4 gives 286 units for 1 cubic foot, being equivalent to the evaporation of 0·288 lbs. of water, or 54·33 lb by the combustion of 1 lb of gas. The calculated and practical values being as 1· to 0·866.

From these experiments it will be seen that the loss of heat by absorption with the apparatus, radiation, conduction, and various other causes, is nearly one-half of the total quantity, the average afforded to me being 0·560 to 1·. They also show that the loss is greatest with those gases containing a large percentage of hydro-carbons, compared with those where such are absent, and appears to follow the law of the *inverse ratio* of their *specific gravities*. These results were so unlooked for, and contrary to received opinion, that I was at a loss how to account for it, as it could not be traced to imperfect combustion, and it was not until after consulting a learned and esteemed friend that a solution could be arrived at.

I shall only further compare these results with the calorific value of the English, Scotch, and American coals, which comprise the great coal fields of the world. For those of America I will adopt the experiments of Prof. Johnston, conducted under the authority of an act of the American Congress, 1841, upon the evaporative power of forty-one varieties from the various coal fields of America, from which I select four representing a fair average. The experiments on the Scotch and English were made in this country. In the class of Welsh coals there are 28 varieties reported upon; Lancashire, 12; Newcastle, 7; and of the Scotch varieties, 7. I have taken the mean of the total experiments in each division, thereby affording a fair average value of the heating power of coal, consumed under the best conditions for generating steam which the present state of science has devised. These results are embraced in a tabulated form, in the last column of which 1 lb of the combustible is reduced to the decimal of a horse power, and from which it appears the relative evaporating powers of coal and gas are weight for weight as 1 to 2½. But the cost and economic value of 2½ lb of coal, compared with the cost and economic value of 1 lb of gas as *fuel*, may become matter for further inquiry and discussion in the columns of the AMERICAN GAS-LIGHT JOURNAL.

TABLE OF COMPARATIVE VALUES.

		Specific gravity of gas.	Cubic feet equal to 1 lb	Units of heat from 1 cubic foot by calculation.	Units of heat from 1 cubic foot by experiment.	Decimal proportion, calculated value at 1·.	Water evaporat'd in lbs. by 1 cubic foot.	Water evaporat'd in lbs. by 1 lb. of gas.	Decimal equivalent of 1 lb. to 1 horse power, 33,000 being 1·.
	Boghead Cannel.	·685	19·1	1213	558	0·485	0·595	11·27	0·323
	Boghead and Amiston.	·658	19·86	1224	588	0·48	0·595	11·81	0·354
	Shale, sp. g., 1·733.	·650	20·33	1188	524	0·441	0·5304	10·782	0·323
	Mixed Cannels.	·595	21·15	1114	544	0 488	0·55	11·645	0·349
	Mixed Gases.	·440	30·14	886	472	0·533	0·478	14 4	0·431
	Mixed Gases	.246	63·87	497	312	0·628	0·316	20·17	0·6
	Hydrogen	.0693	189·	328	284	0·866	0·288	54·33	1·626
American.	Anthracite	..	..	..	..	..	..	10·70	0·31
	Newcastle	..	..	..	..	..	..	8·66	0·259
	Pictou (Cunard's)	..	..	..	..	..	..	8·48	0·254
	Cannelton (Indiana)	..	..	..	..	..	..	7·34	0·219
	Dry Pine Wood	..	..	..	..	..	..	4·96	0·149
Eng.	Welsh ..... average	..	..	..	..	..	..	9·03	0·27
	Lancashire ... "	..	..	..	..	..	..	7·88	0·236
	Newcastle.... "	..	..	..	..	..	..	7·86	0·235
	Scotch.	..	..	..	..	..	..	6·66	0·199
	Conception Bay, Chili.	..	..	..	..	..	..	5·72	0·171

——— GAS-WORKS, SCOTLAND, 23d April, 1860. OBSERVATOR.

ON THE LEAKAGE OF GAS-MAINS.

This is a subject of great importance, and one which varies so much under different circumstances as to produce great influence on the returns of gas companies. Where every degree of foresight and economy has been exercised in the actual manufacture of gas, it may afterwards be so much diminished by leakage between the gas-holder and the meters of the consumers as to reduce the profits of the company to an alarming extent. The amount of leakage is variously estimated at from 10 to 30 per cent. Many gas managers insist, that when the mains are properly laid and the joints properly made, the loss by leakage should not exceed 10 per cent. Mr. Croll, in his parliamentary evidence, estimated that one-sixth of the whole gas sent out would be absorbed by leakage and stealage. Besides these sources of loss, there is a diminution of gas by condensation in passing through under-ground mains at a low temperature.

Mains are now made in a very superior manner, and the oldest gas-works are those in which the most extensive leakage prevails. There is also reason to suppose that the pipes are now cast in a superior manner, the metal being closer and more solid in texture, so as not to admit of so much leakage as that which prevails in porous and imperfect castings.

It is remarkable that although gas in passing through the mains is always under a certain pressure which is generally supposed favorable to leakage, yet Professor Graham has found, on examining the gas, that as much as 25 per cent. of atmospheric air has penetrated the pipes and mingled with the gas. This is an instance of that curious process termed by chemists *endosemose*, by virtue of which gas will pass through solid barriers and enter into a state of mixture with each other. Professor Brande is of opinion, that in common coal gas, ammonia and some of its compounds are probably concerned in some of the curious phenomena of exosmose and endosmose. The peculiar penetrating properties of ammonia are well known, and the Professor thinks that the fetid odours which accompany gas mains and pervade the soil surrounding them, are more attributable to the escape of ammonia than to the tar and naphtha which have hitherto been supposed to cause them.

Not only is such a mixture of coal gas and atmospheric air frequently effected, but there are many instances in which gas has been known to enter water pipes, to the great injury of health, and even to the danger of explosions, which have more than once been occasioned through this cause.

The porosity of cast iron has long been a well-ascertained fact, and numerous experiments have been quoted to show that under high pressure even water may be forced through its pores and made to appear as a damp film on the outside of the pipes. It is also certain that ordinary cast-iron pipes are permeable by gas, as the soil in contact with gas pipes is almost invariably found to be saturated with gas, nor is the saturation confined to the joints, but continuous throughout the length of the pipes. *These facts render it evident that great attention should be paid to the quality of the cast iron of which the pipes are composed, and that the pipes themselves should be tested by a pressure of water, as in the case of water-pipes.* Much greater attention is also now paid to the joints, which are made in a very superior manner to that formerly in use.

The effect of too great a pressure on the gas, when delivered into the mains, tends to considerably increase the leakage. Mr. Low mentions a case in which a loss of 75 per cent. of all the gas made was sustained by the company, and this great loss, he states, was principally due to a pressure of two inches head of water which had been kept in the pipes. As soon as this pressure was diminished, the leakage was considerably reduced.

The loss of gas by leakage from the pipes is something enormous. Even by those who are remarkable for the closeness and illiberality of their estimates, it is computed at 10 per cent. of the whole quantity produced, whilst it is frequently estimated as high as one-third of the whole quantity when it serves the interest of the existing gas companies to put their expenses as high as possible for the purpose of preventing competition, reducing their parochial taxation, and other similar occasions. There can be little doubt that a great part of the gas lost in this way arises from the present vicious system of managing the streets in large towns.

PETROLEUM OIL.—Mr. George Wilson, the eminent maker of stearic acid, has greatly improved the distillation of natural petroleum by adding to the use of superheated steam that of a vacuum, by means of an apparatus similar to the one used in sugar-making.

SAD ACCIDENT AT THE PHILADELPHIA GAS WORKS.—One of the employees of the gas-works, by name John Garwood, fell a few days since, from the tower of the building to the ground. He was taken to the hospital, and found o be badly injured.

BALLSTON, N. Y.—The trustees have granted permission to a gentleman of Albany to put down gas mains in the streets of this village. The work will soon be commenced, if sufficient encouragement is given to warrant it. About sixty consumers are necessary. Here is a chance for enterprise.

NORWICH, CT.—This company is under the general stock-law of the State, being the substance of the old company which passed out of its shell a couple of years ago. The works were built by George Dwight & Co. They use Belgian clay retorts. Mr. Douglass, the engineer, has a new twist about retorts which may come to something if he will only develop it.

ANNUAL REPORT OF THE COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE,
January 26, 1860.

SIR,—In compliance with the 14th section of the act entitled "An Act in addition to an Act to promote the progress of Science and Useful Arts," approved March 3, 1857, I have the honor to submit the following reports of the operation of this Office, during the year terminating the 31st of December, 1859:

No. 1.

STATEMENT OF THE TRANSACTIONS OF THE PATENT OFFICE DURING THE YEAR 1859.

Number of applications for patents during the year 1859	6,225
Number of patents granted, including designs, re-issues and additional improvements	4,588
Number of caveats filed	1,097
Number of applications for extension of patents	41
Number of patents extended	32
Number of patents expired, Dec. 31, 1859	563

Of the patents granted, there were—

To citizens of the United States	4,491
To subjects of Great Britain	23
To subjects of the French Empire	16
To subjects of other foreign governments	8

The patents issued to citizens of the United States were distributed among the several States, Territories, &c., as follows:

New York	1,237	Michigan	64	Alabama	26
Pennsylvania	532	Vermont	63	Mississippi	25
Massachusetts	492	Missouri	63	South Carolina	15
Ohio	390	Georgia	58	Delaware	12
Connecticut	256	Dis't of Col'mbia	58	Arkansas	5
Illinois	206	Maine	51	Minnesota	5
Indiana	142	Louisiana	51	Florida	4
New Jersey	119	California	43	Oregon	1
Maryland	116	Kentucky	41	Wash. Territo'y	1
Rhode Island	85	Iowa	37	U. S. Army	4
Wisconsin	71	Tennessee	31	U. S. Navy	2
Virginia	65	Texas	29		
New Hampshire	65	NorthCarolina	26	Total	4,491

No. 2.

STATEMENT OF MONEYS RECEIVED AT THE PATENT OFFICE DURING THE YEAR 1859.

Received on applications for patents, re-issues, additional improvements, extensions, caveats, disclaimers, and appeals	$228,864 00
Received for copies and for recording assignments	17,078 15

No. 3.

STATEMENT OF EXPENDITURES FROM THE PATENT FUND DURING THE YEAR 1859.

For salaries	$93,242 36
Temporary clerks	42,475 25
Contingent expenses	41,561 48
Payments to judges in appeal cases	875 00
Refunding money paid into the Treasury by mistake	391 00
Refunding money on withdrawals	30,733 32
Total	$210,278 41

No. 4.

STATEMENT OF THE CONDITION OF THE PATENT FUND.

Amount to the credit of the Patent Fund on the 1st of January, 1859	$50,241 82
Amount paid in during the year	245,941588
Total	$296.184 03
Deduct the amount of expenditures during the year	210,278 41
Which leaves in the Treasury on the 1st of January, 1860, the sum of	$85,905 62

No. 5.

TABLE EXHIBITING THE BUSINESS OF THE PATENT OFFICE FOR SEVENTEEN YEARS, ENDING DECEMBER 31, 1859.

	Appli'ns filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1843	819	315	531	$35,315 81	$30,776 96
1844	1.045	380	502	42,509 26	36,344 73
1845	1,246	452	502	51,076 14	39,395 65
1846	1,272	448	619	50,264 16	46,158 71
1847	1.531	533	574	63,11 19	41,878 35
1848	1 628	607	660	67,576 69	58 905 84
1849	1,955	795	1,070	80 752 78	77,716 44
18 0	2.193	692	995	86,927 05	80,100 95
1851	2 758	766	869	95 738 61	86,916 93
1852	2 639	996	1,020	112 056 34	95,916 97
1853	2 673	971	958	121 627 45	132,869 83
1854	3 324	868	1,972	168,789 84	167,146 32
1855	4,435	906	2.024	216,459 35	179,640 33
1856	4.900	1,024	2.502	192 688 02	199,931 62
1857	4 771	1,010	2,910	196 132 01	211.582 09
1858	5,364	943	3.710	203,716 16	193,193 74
1859	6,225	1 097	4 538	245 942 15	210,278 41
Total	48,338	12,437	25,884	$2,025,483 01	$1,888,653 21

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WILLIAM D. BISHOP, Com'r. of Patents.

To the Hon. JOHN C. BRECKENRIDGE,
Vice-President U. S.

PATENTS.

Inventors are informed that Patents are procured at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, through F. C. TREADWELL, Jr., Esq., an experienced Patent Agent and Expert.

UNITED STATES.

27,708.—Daniel D. Farnham, of Johnstown Center, Wis., for an Improvement in Well Buckets:

I claim hanging the buckets by chains, D, when the bails are attached to the ends of the buckets below and in front of the succeeding chain, in combination with the holding pins, h, and hooked arm, c, as described and presented.

[This invention consists in giving to the well buckets a peculiar shape, in connection with a novel mode of hanging them, whereby they will more readily enter the water, and emerge therefrom; and it also consists in arranging on the end of each bucket a suitable pivoted hook which will attach itself to the cross bar of the bail as the buckets descend and turn the bucket while in the water, and keep it in the desired position for holding water while it is being elevated, and thus prevent it from casually upsetting before it reaches the discharge spout in the curb.]

27,718.—Samuel B. Hopkins and Edward H. Anderson, of Easton, Md., for an Improvement in Vapor Burners:

We claim the original arrangement and combination of parts, as above set forth, viz., the attachment of the burner, F, the circular convex plate, C, and the circular, D, all as set forth, forming a distinct apparatus, capable of being attached to the ordinary slide, A, of a single tube fluid lamp, by which a light equal to that given by four ordinary tubes combined is obtained, with one-third the amount of oil, operating and constructed as set forth.

27,732.—Oscar F. Morrill, of Boston, Mass., for an Improvement in Vapor Burners:

I claim my improved arrangement of the tubular rotary cut-off and its elevating spring, with reference to the jet tube and the screw cap, such cut-off being provided, or not, as circumstances may require, with a device for moving it both laterally and longitudinally, and such device being arranged at its lower part, substantially as described.

27,892.—T. B. DeForest, of New York City, assignor to himself and Wallace & Sons, of Ansonia, Conn., for an Improvement in Lanterns:

I claim the combination of the fastening springs, S and the encircling band, B, with the lamp of a lantern, when said lamp and encircling band, or either of them, have depressions, or their equivalents, formed in their surfaces, substantially as described and for the purposes specified.

27'898.—Isaac P. Frink, of Newark, N. J., for an Improved Reflector for Gas-lights:

I claim the arrangement of a rectangular pyramidal reflector, A, with beads, b b', near the upper and lower edges, in combination with a curved cover, B, and with a hinged adjustable section, C, constructed and operating substantially in the manner and for the purpose specified.

[This invention consists in combining with a rectangular truncated pyramidal reflector, a curved cover of such a form and at such a distance from the top of the reflector that all the rays of light thrown upwards through the opening in the top of the reflector are turned back by the cover through said opening. The sides of the reflector are strengthened and ornamented by beads, which also serve to catch such rays as would otherwise escape over the edges of the reflector without any useful effect; and a hinged section is secured to one of the sides of the reflectors, whereby the rays of light can be concentrated more or less on any given point.]

27,902.—James Hare, Jr., of Patterson, N. J., for an Improved Oil Cock:

I claim the arrangement of the nut, D', in combination with the movable plug, A, and with the stationary globe, B, constructed and operating substantially as and for the purpose specified.

[The object of this invention is to produce a cheap and effective lubricator for steam cylinders and similar devices, and the invention consists in the arrangement of an oil cup, in which the plug is always kept perfectly tight by means of a nut which screws down over the end of the plug, whereby the oil cup is kept perfectly tight and easily adjusted.]

27,905.—Cornelius Hood, of Seneca Falls, N. Y., for an Improvement in Pumps:

I claim the arrangement and combination of the hollow piston, H, with the internal short cylinder, G, and external cylinder, D, valves, g b, and annular valve, d, to form a continuous-acting pump, substantially as and for the purposes set forth.

27,912.—Henry Johnson, of Washington, D. C., for an Improvement in Vapor Lamps:

I claim, first, The pipe, B, when used as a fluid pipe and generator or vaporizer, and also when used as a gas pipe in connection with nib, C, for the conveyance of fluid from the supply pipe for generating or vaporizing, and for conveyance of gas or vapor to the burner.

Second, The combination of the two regulating set screws or keys, G and F, operating substantially as set forth and for the purposes described.

27,924.—P. A. Morley, of Brooklyn, N. Y., for an Improvement in Lanterns:

I claim the arrangement of the sides, N N1 N2 N3, loops, a a1 a2 a3, and rods, b b b b, in relation to the top and bottom of a lantern, in the manner and for the purpose specified and shown in the accompanying drawings.

27,935.—John Taney, of Austin, Texas, for an Improvement in Apparatus for Boring Artesian Wells:

I claim combining with the tubes, B and E i i, which are provided with arms, H H and H2, and with dovetail grooves in their surfaces, valves, U R and D, valve piston, F2, and solid piston, F, in the manner and for the purpose specified.

27,945.—Henry Belfield (assignor to himself and S. W. Hoffman), of Philadelphia, Pa., for an Improvement in Pumps:

I claim the shaft, D, its two cranks, d and d', in combination with the rods, G and G', and valved buckets, I and I', and their valves, A and A'; the whole of the parts being constructed and arranged as set forth, so that a simultaneous reciprocating motion, in contrary directions, may be imparted to the said buckets by the rotation of said shaft, D, and so that the two barrels may be in a direct line with each other.

27,971.—Alfred Damarin and G. C. Brower, of New Orleans, La., for an Improvement in Construction of Instruments for Lighting Gas:

We claim, first, The combination of the wax taper-holder, with the gas key.

Second, The bending of the taper-holder, so as to light gas through the top of the glass globe.

Third, The placing a flame guard beyond the end of the taper-pipe.

Fourth, The leaving an open space between the said guard and the end of the pipe, all substantially as described.

27,995.—Michael Massey, of Cleveland, Ohio, for an Improvement in the Construction of Candle Machines.

I claim the combination and operation of the several devices, viz.: the split pipe, P, the right and left screw, S, the springs in the sliding frame, A, the knife, K, the receiving boards, H, and the drum, G, as described and operating for the purpose set forth.

I also claim the continuous split pipe to form a steam chamber or ice box as specified.

27,996.—Levi Matthews, of Antrim, Ohio, for an Improvement in Pumps:

I claim the employment of a reciprocating cap-board, disc or vane, immersed in the water of the well and operating conjointly with the plunger, in combination with a stationary receiving valve or valves to the pump, arranged to face said cap-board, or thereabouts, and so that the cap-board plays to and fro above said valve or valves, substantially in the manner and for the purpose or purposes herein specified.

28,012.—Robert Ramsden, of South Easton, Pa., for an Improvement in Pumps:

I claim the combination of the plunger, E, constructed as described, with the chambers, B and C, the stuffing boxes, a a a a, and d d d d, and the valves, f and g, substantially in the manner described and for the purposes set forth.

28,058.—J. E. Boyle, of Brooklyn, N. Y., for an Improved Vacuum Valve for Water-heating Apparatus:

I claim the application to close kitchen or house boilers of a cup leather valve, substantially as described for the purpose set forth.

28,063.—M. V. B. Buel, of Buffalo, N. Y., for an Improvement in Vapor Lamps:

I claim having the burner, E, connected to the receiver, or fount, B, by a tube, C, so that the top of the burner will extend above the highest level of the fluid in the receiver or fount, B, for the purpose specified.

[This invention relates to certain improvements in that class of lamps generally known as vapor lamps: those in which the burning fluid is volatilized and gasified in the lamp previous to burning. The object of this invention is to avoid the accidents attending the use of this class of lamps, and also to volatilize the fluid without the aid of an auxiliary flame or heater.]

28,090.—George Lindsay, of Petersburgh, Va., for an Improvement in Pumps:

I claim the pump barrel, in combination with the large piston or plunger, B, the small piston, C, and the hand wheel, or its equivalent, for connecting and disconnecting the pistons, the whole being constructed and operated in the manner and for the purpose set forth.

28,091.—Benjamin Livermore, of Hartford, Vt., for an Improvement in the Construction of Cement Drains:

I claim covering or enveloping the cement aqueduct or water pipe, as it is being laid in the ditch or trench, with the flexible material, d j, in the manner and for the purposes substantially as described and set forth.

Also the attachment to the mold or former of the spindle, f, for the purpose specified.

28,113.—G. W. Thompson, of New York City, for an Improvement in Gas-burners:

I claim the regulator composed of the valve, D an independent weight, E, or its equivalent, and a stop, g or h; the whole applied to a burner and operating substantially as described.

28,132.—John Stuber (assignor to John Carton), of Utica, N. Y., for an Improvement in Lamps:

I claim, first, The air chamber, I, and the air tube, K K2, as described, or substantially in that form, in combination with a shallow can, as described.

Second, The outer tube, D, in combination with the cap, E, chimney, L, and button, M, as substantially described.

28,138.—G. H. Jones and John Brown, of Rose, N. Y., for an Improvement in Water Wheels:

We claim the employment of the regulating lever, f, float, D, and gate, e, actuated by the discharge water of the wheel, to regulate the speed thereof, substantially in the manner and for the purposes shown and described.

28,140.—J. E. Atwood, of Bucksport, Me., for an Improvement in Pumps:

I claim the combination of the main cylinder, J, with air chamber, K, regulating screw, L, stationary chamber, D, valves, E and A, with the discharge pipe, C, the whole operating in the manner and for the purpose set forth.

28,143.—S. D. Baldwin, of Milwaukie, Wis., for an Improvement in Generators for Vapor Lamps:

I claim placing the generator at right angles to the slit of the burner, and so attaching it to the end of the tube or generating chamber, as to allow of its being closer upon, or further from the top of the burner, and to be susceptible of being used as set forth.

28,154.—James Calkin and P. A. Hover, of Hudson, N. Y., and C. W. Grannins, of Gowander, N. Y., for an Improved Furnace for the Combustion of Coal-Oil and similar Hydro-Carbon Fluids:

We claim the fuel pan in combination with the chamber pan, and both constructed and arranged substantially in the manner and for the purpose set forth.

28,184.—Henry Knight, of Jersey City, N. J., for an Improvement in Molds for Molding Cement Pipes:

I claim, first, The combination of the stationary core, B, mold, F, with base, E b, and hinged table, C, construct d and arranged for joint operation in the manner and for the purpose described.

Second, The stationary core, B, and mold F, having the enlarged top, d e f, and base, F b, in combination with hinged table, C, and detachable collar, G, in the manner and for the purpose substantially as specified.

28,193.—Walter Peck of Rockford, Ill., for an Improvement in Pumps:

I claim, first, Coupling the lower end of the pump to a fixed stand, P, or its equivalent, by means of a universal joint, substantially as described, for the purpose set forth.

Second, In combination with the moving rod or pipe, a, the stationary collar, e, and sliding collar, f; the whole arranged and operating substantially as described, for the purpose set forth.

28,199.—Octave Saulay, of New Orleans, La., for an Improvement in Lamps:

I claim the combination of the dome, H, constructed with spiral chambers, L L L, through which the air is circulated and heated with a lamp, arranged as described, for illuminating the apartment; the lamp and its mountings being used to illuminate, warm and ventilate, substantially as set forth.

28,246.—Luther Atwood, of New York City, for an Improvement in Construction of Apparatus for the Re-distillation of Coal Oils :

I claim a separaing chamber, constructed substantially as described, when arranged and combined with a volatile oil still and condenser, in such a manner as to gradually separate and condense the heavier parts of the oleaginous vapors formed, and continuously return them to the still, for a further action of the heat, and at the same time preserve the lighter vapors, and pass them over to the condenser, substantially as described, and substantially for the purposes set forth.

28,250.—Wm. N. Brown, of Camden, N. J., for an Improvement in Vapor Burners :

I claim the combination of a heat conductor with a non-conductor, in hydro-carbon vapor burners, for the purpose of securing to the heat conductor the greatest possible heat-conducting power, by employing a metallic heat conductor, encased in a non-conducting or partially non-conducting material, as described, and for the purposes set forth in the above given description of my invention, and in the drawings hereunto annexed, or any other mode substantially the same, and which will produce the intended effect.

28,258.—T. G. Clayton, of Washington, D. C., for an Improvement in Vapor Lamps :

I claim the converting of the fluid into gas or vapor below the illuminating flame by means of the combined generator and burner B, and the jets of burning vapor below said burner and generator, the whole operating as described, and for the purposes set forth.

Second. The burner and generator B, having the gas chamber C below it, constructed and operating substantially, as set forth.

Third. The use of jets of gas from chamber C, or burner B, for making an oxyhydrogen flame, for heating below the combined generator and burner, as set forth.

28,282.—Wm. Kennish, of London, England, for an Improved Hydraulic Motor :

I claim a diaphragmed snail or other suitably shaped piston C, which has an opening in its face and another one in its back, in combination with a diaphragmed hollow shaft D, which has corresponding openings with those of the piston, substantially as and for the purposes set forth.

28,299.—I. W. Pettibone, of Norfolk, Conn., for an Improvement in Vapor Lamps :

I claim the combination of the vapor valve at the mixing chamber with a supplementary valve—the two being constructed and operating substantially, as set forth.

I also claim the combination of the mixing chamber with an air tube or tubes, to deaden the whistling noise which generally accompanies such burners.

I also claim arranging the air tube in such a manner with reference to the mixing chamber of the vapor burner, that it can be removed therefrom, to permit cleaning, substantially as herein set forth.

28,306.—J. H. Rollins, of Wapello, Iowa, for an Improved Vapor Lamp :

I claim the combination, with the vaporizing chamber F, of the removable, flanched, screw-bottom a, and globe I, so that the globe will be supported or hung from said bottom—all as and for the purpose shown and described.

[This invention relates to an improvement in that class of lamps which are designed for burning volatile hydro-carbons, and which vaporize the fluid in a chamber distinct from, but connected with, the fount, by the heat from the illuminating flame. The object of the invention is to facilitate the cleaning of the lamp, and also to prevent a shade being cast by it, while permitting the use of a glass globe.]

28,314.—A. M. Swain, of Lowell, Mass., for an Improvement in Water Wheels :

I claim, first, The annular chamber I, arranged substantially as shown, and provided with slots to receive the guides e, when the latter are attached to the cylinder J, for the purpose set forth.

Second. The arrangement of the guides e, and cylinder J, attached to curb B, and chamber I, forming the gate, when said parts are arranged in relation to the wheel G, substantially as and for the purposes specified.

Third. The adjusting of the block E, by means of the bar b, and set screws c, for the purpose of adjusting the wheel to compensate for the wear of the step.

[The object of this invention is to obtain a simple and efficient horizontal water wheel—one that will have all its parts accessible for repairs, and which will give the maximum power of varying heads with an economical use of the water.]

28,315.—R. A. Tilghman, of Philadelphia, Penn., for an Improvement in the Method of Decomposing Fats into Fatty Acids and Glycerine :

I claim the process of decomposing fats into fatty acids and glycerine by means of water at a high temperature and pressure, either with or without the presence of an alkali—

1. Applying the water in several successive portions and removing these portions when partly saturated with glycerine.

2. Arranging the fat and water in shallow layers so as to give an increased surface of permanent contact between them.

3. Causing the fat and water, arranged in shallow layers, to flow in opposite directions, so as to bring fresh water in contact with the partly decomposed fat.

28,317.—Maurice Vergnes, of New York City, for an Improvement in the Construction of Voltaic Gas Batteries :

I claim the use, in gas batteries or combined acid and gas batteries, of porous platinized coke, substantially as and for the purpose set forth

I also claim the general arrangement of the whole battery or apparatus substantially as described.

28,333.—Emil Trittin, assignor to himself and J. A. Cummings, of Philadelphia, Pa., for an Improvement in Burners for Vapor Lamps :

I claim, first, the tube, A, with its chamber C, and slotted top, a, in combination with the stem D, and the attachment E, or its equivalent; the whole being arranged substantially as and for the purpose set forth.

Second. The cap d, with its openings, having inclined sides, y, in combination with the slotted top a, of the burner; the whole being arranged and operating substantially as specified.

RE-ISSUE.

Wm. Mallerd, of Bridgeport, Conn., for an Improvement in Gas Regulators. Patented Oct. 8, 1858 :

I claim arranging the graduated lever, 4, with the adjustable weight 17, in combination with the gasometer 2 2, and the valve 10, in such a manner that by raising the gasometer the valve is closed, and the supply of gas is stopped, so that the pressure of the gas in the gasometer can be regulated by adjusting the weight 17.

And in combination with the lever, gasometer, and reservoir, I claim admitting the gas direct against the gas meter by means of a small tube, 8 which is contracted towards its upper end, so that impurities carried up by the gas or any other deposit will fall outside of said tube without being able to interfere with the working part of the gas regulator.

I also claim arranging the stud, 21, in combination with the lever, 4, rod, 9, and valve 10, in such a manner that by depressing the stud, 21, the supply of gas may be ascertained, without raising cover the of the gas-regulator.

CORRESPONDENTS' COLUMN.

THE PROPOSED GAS CONGRESS.

PHILADELPHIA, May 18th, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL :

I think some of your readers have misunderstood my communication of March 13th, in regard to a Gas Congress. I intended, as it reads, for a meeting of all CHARTERED GAS COMPANIES. Each and every such company to select one representative, which might be done either by election or resolution of the Board of Directors; and when such delegate presented himself, with a certificate, under seal, of the company by whom he was chosen, he should be allowed a seat, on the same principle that other representatives are elected. I see, in your last number, several have taken quite a different view, and think it a CONGRESS OF GAS-ENGINEERS, and as such say they shall claim a seat; to which, certainly, there would be no objection, providing, however, they are the chosen delegates of any chartered company, but as simply an engineer he certainly could not claim a seat. I would not think of claiming a seat unless I were elected a delegate by some company.

Mr. Editor, I do think such a meeting is of the utmost importance to gas companies, and hope all may take early steps to carry the scheme through.

Your correspondent from Cincinnati, Mr. Progress, has committed an errror. He speaks of my strictures on opposition companies, and says I was engaged in getting up such companies, and names Charleston, S. C. For the information of Mr. Progress, I will say I never had anything to do with that company, either directly or indirectly (he probably refers to the Wilmington, N. C. Gas-Company), and am, for good and sufficient reasons, opposed to all opposition gas companies.

I am yours, truly, S. R. BRICK,
Gas Engineer.

ON THE RELATIVE COST OF ILLUMINATION.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL :

Allow me, as a reader of your truly valuable JOURNAL, to express my gratification on perusing the commencement of a paper by Dr. Charles M. Wetherill, in your issue of May 1st.

Conceiving that the great changes in prices of materials for producing light, and more especially the introduction into extended use of coal oils, had modified the ratio of cost formerly existing, I had commenced some experiments on this subject before Dr. W's paper appeared.

It is apparent from the details in the first part of this paper, that the writer, who is known to me as a careful experimenter, will include amongst his subjects several solids consumed for affording light in the Western States not commonly found in our markets, and that the list will be more full, and the experimental results more valuable in this country, than any which have been published

If Dr. W. were near me, I would make one suggestion in relation to the photometric comparisons which form the basis of his subject: it is the importance of noting the temperature at which the solid, and indeed the fluid materials for light are burned.

In burning a solid body for producing light, the heat employed in fusing it, and in volatilizing the fluid after it is produced, is so much chemical effect lost in performing a necessary part of the action. Hence a candle does not afford so much light for a given weight burned as the material of the candle would, if burned in a fluid form from a lamp. Nor does a candle afford the same amount of light when burned at 40° F., as it would do at 80° F.; and in experiments of so much value as these we are considering, this point of temperature should not be overlooked.

It may be fairly presumed that the experiments of Dr. W. have been made at the temperature of a room comfortably warmed, and that the relations tabulated are those borne at such a standard of temperature. H.

Boston, May 21, 1860.

GAS-WORKS WANTED.

AMSTERDAM, N. Y., April 25th, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL :

The citizens of this village (situated close to the Central Railroad and Erie Canal, about thirty miles west of Albany, containing a population of about 3,000.) propose to light the village with gas, but are divided in opinion whether it would be better to use coal-gas, or gas manufactured by the Aubin patent, (that is, from rosin, sawdust and coal.) Will you please give us your opinion, through the AMERICAN GAS-LIGHT JOURNAL, which of the two kinds it would be better for us to adopt. The consumption of gas would probably be near 3,500 feet daily.

JAMES L. VOORHEES.

Parties wishing to communicate with our correspondent, and submit their proposals and arguments, can do so by addressing Mr. Voorhees, as above—ED.

NEW GAS-WORKS UNDER WAY.

We hear of about fifty new gas-works being erected in the State of Pennsylvania, and nearly two hundred more in the West.

Works are also progressing in the towns of Westfield and Greenfield, Mass., and in Dobbs' Ferry and Hastings, Penn-Yan, Amsterdam, Kinderhook and Vallatie, in this State, and Painesville, Ohio. In Cuba new works are being built in San Antonia, Guanajay, and Pinar del Rio. The Villa Clara Gas-Light Company are building these works.

WATER-GAS POETRY.

A Correspondent sends us the following lines as being one of the early efforts of his gassy Muse. While we should object to publishing anonymous communications of a personal character, even when clothed in the attractive charms of a poet's fancy, we cannot refuse to print the verses of an enthusiast, who offers them, as in the present case, over his own appropriate name :

For weeks, with Carey's watery gas,
The public have been nigh to bursting;
And though with fire and sword, alas!
The bold Professor has been worsting,
In vast and indiscriminate slaughter,
The gassy advocates of water;
Never seeming to flutter nor falter,
With shovel and tongs, all fiercely clutched,
Like an alchemist in search of gold;
And bellowing, as if his lips had been touched
With a live coal from another altar,
Than that which anointed the prophet's of old;
And though our famished souls are thirsting
For something a little less gassy and watery,
Believing the whole concern is a lottery,
By which we are sure in the end to be sold;
Yet before we cut loose from the learned Professor,
We're are bold to read him a gentle lesson
On gas manufacture! Nay, do not start!
Even Hannibal's self would discuss the art
Of war, with a tyro!—then why not to Cresson
In confidence friendly a secret impart,
Of which we have happened to be the possessor.

If, then, without any palaver or flummery
You want to make gas—dispense with your mummery
Of water and rosin—and here is your summary!
Let Cresson furnish the retort,
(Courteous, if possible, but strong,
He's shown already he can do it;)
Take Carey's tariff letters—any long
Statistical or dull Report
Written to President or Poet;
They're all of Coal and Iron full,
Which makes them so infernal dull,
You cannot miss, if blind you go it,—
Take the Report,
And into the Retort,
Gently drop it—
And, alas! if missing
The crucible, you chance to throw it
Into the fire below, don't stop it,
For Heaven's sake—but let it burn;
And take another—You will earn
A title to a public blessing,
It thus by accident, in turn,
You work a dozen off—Oh, glorious chance!
A blessing thrice your due, for copies in advance!

Now for the acid—quite dilute yet sour
The vinegar's on hand—an ample store;
Just like the *correspondence* of the *hour*,
And doubtless *Marmaduke* can furnish *More*.

No need for water—have a care to dip
The tariff letters to poor Bryant, bored,
Each in its answer—for the Poet poured
Cold water enough on, to sink a ship.

Then boil the mixture—and, if all the gas
Required to light creation, don't soon pass,
Set down your humble servant for an

PHILADELPHIA, May 10, 1860. ASS.

BROADWAY GAS-LIGHT COMPANY.

We announced in our February number that a contract had been entered into with private parties for lighting the Metropolitan Hotel block on both sides of Broadway. The contract was brought to our Rooms a few days ago, and it appears to include every occupant of that district. A company, called the Broadway Gas-Light Company, is about being organized, with a capital of $100,000, we believe, to erect the works on Jersey street, in the rear of the hotel. There is a talk of another local company to light a similar district lower down town, the particulars of which have not yet transpired.

ST. AUGUSTINE, FLA.—Why is not this beautiful old town lighted with gas? We have reason to believe a proposition to do it would be responded to by the citizens.

NEW GAS-COAL.—A specimen of gas-coal found near Cairo Station, Ritchelieu Co., Va., has been left on exhibition at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

WILLIAMSBURGH, N. Y.—This company have recently purchased over fifty lots on the block bounded by North Eleventh and North Twelfth streets, Front street and the East River, upon which they propose to erect new and extensive gas-works.

THE UNIVERSAL LIME-LIGHT COMPANY.—The London *Times* publishes the following advertisement :

"THE DIRECTORS of the UNIVERSAL LIME LIGHT COMPANY inform the Shareholders and the public that the NEW BRIDGE, at Westminster, is now LIGHTED by their system every night, and affords a favorable opportunity of judging of its merits.—Offices, 33 Cornhill, E. C."

IMPORTANT TO GAS CONSUMERS.

SUPREME COURT—GENERAL TERM.

Before Hon. Judges SUTHERLAND, MULLEN and LEONARD.

MAY 10.—*The People of the State of New York, by the Attorney-General, vs. James Bowen, and others.*—This is virtually an action against the Metropolitan Gas-Light Company, the defendants being directors in the act of incorporation of that institution. The object of the action, as set forth in the prayer for relief, is, that an act to incorporate the Metropolitan Gas-Light Company of the city of New York, may be adjudged to be in violation of the constitution of this State, and null and void, and that the said defendants may be adjudged to unlawfully assume and usurp the franchise of being a corporation and to act as a corporation without legal authority or right. The complaint then alleges that the act is unconstitutional, for the reason that it is a special act and therefore void, as the constitution limits the passage of special acts to cases where, in the judgment of the Legislature, the object of the corporation cannot be obtained under general law; and this gas company could have been formed under a general law applicable thereto; that the act of incorporation was not approved by the Governor until after the adjournment of the Legislature, and for this reason failed to become a law; that the act is unconstitutional and void, as creating a monoply; and further, that the company did not commence the transaction of its business, and thereby its corporate powers have ceased. It further appeared that in June, 1855, the defendants, pretending to act as a corporation under the name of the Metropolitan Gas-Light Company, petitioned the Common Council for permission to lay conductors through the streets. In September the Board of Councilmen granted permission, but in December the other Board non-concurred. In December, 1858, the Councilmen passed another resolution giving the company permission, which was concurred in by the Board of Aldermen on the 27th of December, 1858.

Mr. Wm. M. Evarts, on the part of the people, contended that, for the foregoing reasons, the act was a nullity, and the act of incorporation void, &c.

Ex-Judge Slosson and Mr. Waldo Hutchins appeared for the company, and contended that section 1, article 8, of the constitution, gave the Legislature full power to exercise its discretion in the matter of passing this and similiar acts. That the time within which the Governor has power to sign a bill, and which he approves of, is not prescribed by the constitution, and was not intended to be so by the framers of that fundamental law. If he does not approve it he is bound to return it with his objection within ten days. If the Legislature remain in session after that period, and he does not return it with his objections, it becomes a law. If before it is returned with objections (within the ten days) the Legislature should adjourn, then it does not become a law. In this State the Executive forms no branch of the Legislature as the King does of the Parliament in England, and when a bill passes from the hands of the Legislature of this State it has passed their control forever, unless it be returned with objections. At the very session of the Legislature when the bill was passed the Executive signed no less than thirty-seven bills after the adjournment thereof. No exclusive right is given to this company to manufacture, make and sell gas, and the act does not impose upon the Corporation any obligation to grant permission to lay pipe in the public streets of the city. The allegation of *non user* cannot be set up where, as in this case, the proceeding assumes that the pretended corporation had no legal existence; and, further, that a corporation cannot forfeit its charter before it has begun to exist. The learned gentleman cited a number of authorities from the books in support of the foregoing propositions. Mr. Evarts replied, and the Court took the papers but reserved their decision.

COURT OF COMMON PLEAS.

BRADY, Judge.

SINGULAR EXPLOSION OF GAS APPARATUS—ACTION FOR DAMAGES.

Mortimer Lee vs. The New York Car and Steamboat Gas Company.—This action was brought by the plaintiff to recover damages from the defendants for injuries received while in the factory of the defendants by the explosion of one of their gas cylinders. The defendants are manufacturers of gas cylinders for the use of steamboats and cars, at No. 8 Gold street. These cylinders are made to be filled with gas, compressed to a pressure of 200 or 300 pounds to the inch, so that the gas taken therefrom would burn so long as any pressure above that of the atmosphere continued. The great resistance required made it necessary that the cylinders should be of such form and proportions as were best calculated to withstand great pressure. The company had, up to July 13, 1858, when the accident occurred, manufactured and put into successful operation many cylinders, the proportions of which were ten inches in diameter and six feet in length. These were tested at the factory by hydrostatic pressure, and not one of them burst.

A short time before the accident, the Company caused a cylinder to be constructed, *four feet* long, and *eighteen inches* in diameter, by way of experiment, as a short cylinder, of equal internal capacity, would be more convenient in cars and steamboats than a long one. This cylinder was tested at the factory, as usual, by the air-pump. After the pressure had run up to about 343 lbs., as indicated by the guages, the person in charge of the experiment left it and went into the office, without, as it is alleged, leaving any one in charge of the pump, or to observe the amount of the pressure, or whether the cylinder yielded.

The plaintiff and six other workmen were employed in different parts of the shop at the time. While thus left the cylinder burst, with noise and violence equal to the explosion of gunpowder.

A workman, named Sharp, was instantly killed, and the plaintiff's right leg was so badly burt that amputation was necessary. He, it is alleged, is still unable to work at his trade, and has not earned anything since the injury. The plaintiff claims $20,000 damages, on the ground that the defendants' negligence and recklessness caused the explosion.

The defence is a denial of the facts stated in the complaint. Also, it is set up that the explosion was caused by negligence of a fellow-servant. That the plaintiff had left his place where he should have been at work, and seated himself on the cylinder, and was so seated when it exploded. That the explosion was an inevitable accident, not caused by any negligence of the defendants or their servants. Verdict $6 000.

W. G. Harrington and E. W. Stoughton for plaintiff; Doolittle, Ward & Wilcoxson and H. G. Wheaton for defendants.

SOAP-STONE GAS RETORTS.

We have much pleasure in recording the fact, that the State of California has thus early in her gas-lighting history, contributed her mite towards the development of this important interest on the shores of the distant Pacific. We hear that a species of soap-stone, found in large quantities throughout the State, has been used, with great success, as a substitute for iron in the manufacture of gas retorts.

This material, when newly quarried, is of a soft consistency, and, like the lime-stone of the basin of Paris, is susceptible of being cut with ease into blocks or forms of any desired shape.

One gas engineer, according to our informant, constructed his own retorts out of this material, and after having had them in constant operation, at high heats, for a period of ten months, pronounced them, upon inspection, as good as new, stating that he would have burnt out, in the same period of time, several sets of iron retorts such as he had been accustomed to use.

This stone abounds wherever gold quartz exists throughout California, and in parts of Oregon. The cost of mining must be small, and if quarried close to the banks of a navigable stream, we see no reason why, if it proves to be as represented, it should not come into general use for the purposes alluded to, not only in California but in other places on the Pacific where gas has been already, or is likely hereafter to be introduced.

Clay retorts, it is true, have already come into use in Valparaiso, but it would seem as if the risk of breakage and cost of transportation from Great Britain or the Atlantic States would cause them to give place (in the region of the Pacific at least) to retorts made of this new material, should it prove to be all that its friends claim.

We have placed a sample of the English fire-clay (used in the manufacture of Cliff's clay-retorts) lately presented to us, in our own gas-cabinet, and trust to be favored ere long, with a specimen of its California analogue by some kind reader of the AMERICAN GAS-LIGHT JOURNAL in the Golden State.

AN OILY LETTER FROM THE OIL SPRINGS.

As the Oil Springs in Trumbull County, Ohio, are exciting some interest, the editor of the *Yankee Notions* sent his Fat Reporter down there to furnish his readers with an authentic account of them, and we have received the following unctuous letter from that reliable source:

Everything about here is so greasy and oily, it is with extreme difficulty that I can write at all. My pen slips out of my fingers; there is an oily scum on the ink, the paper is fairly transparent, and I slosh around in my chair most unpleasantly. Patience and perseverence (sweet oil is unnecessary here) will, however, overcome many obstacles.

AN OILY TRACK.

I arrived here at a very late hour last night, on an oil train, and might as well have come on *train oil* as we were 16 hours behind time. All trains are behind time, owing to the accumulation of oil on the track at this end of the road. The oil fries out of the ground and lubricates the rails for a great distance. We wouldn't have arrived at all if the passengers hadn't got out and sprinkled the track with cigar ashes.

I slipped out of bed (nobody "rises" here; we all *slip* into bed and *slip* out,) at an early hour this morning, and began investigations. I found a section embracing fourteen thousand acres of land, chuck full of oil springs.

HOW THE WOMEN FRY DOUGH-NUTS.

Drilling rocks is unnecessary, as the oil boils up from the springs, sometimes to the height of 25 feet, and is caught in tin pails as it comes down. On a hot day, it is no unusual thing to see the women frying dough-nuts in these jets of oil. The balls of dough are dropped into the jets, where they are allowed to toss about like corks in a fountain, and fly up in the air, until they are fried by the heat of the sun.

SLIPPERY ELM.

The only species of tree which abounds here is the *slippery* elm. These trees are so slippery a squirrel can't climb them without dipping his claws in Spaulding's Prepared Glue, a small bottle of which he carries suspended about his neck. There are a few maple trees, but no sugar is made, as nothing but oil runs out when tapped.

A RIVER OF OIL.

There is one "considerable sized" creek running through Trumoull County which is all oil. It was discovered a short time ago in a singular manner. Three boys went in bathing, and when they came out they were so greasy they couldn't stay in their clothes. As fast as they slipped them on they would slip off again, and one of the lads narrowly escaped slipping out of his skin. On reaching home their parents, being exceedingly frugal, wrung them out, and extracted about *fourteen gallons of pure oil from the three boys!* Fact. A company are erecting a large candle factory on the banks of this river, preparing to dip candles in it.

AMUSEMENTS.

The principal amusements here are climbing greased poles and catching oiled pigs, the necessary appliances being constantly on hand. Sliding down hill is popular among all classes during the summer months. This is effected without sleds, on a hill of solid tallow, just back of the tavern. As I write, laughter rich and gushing is wafted to my window from a number of the beauties of "Bowers Corners," as they sweetly *subside* down the margin of that melting slope.

GREASED LIGHTNING.

There was a thunder storm this afternoon, and as the electric fluid ran down one of those slippery elms I told you of, I was treated to my first view of "greased lightning." It is quite common here they say. Thunder is divested of all its harsh intonations by the minute particles of oil which fill the air and grease the wheels of Jove's noisy chariot.

If any of your readers think I have "cut it fat" in this letter, let them visit the Oil Springs and see for themselves.

AMINADAB SLEEK.

LAWRENCE, MASS.—This is the scene of the Pemberton Mills calamity of January last. The burning fluid philosophers contend that it was the gas burners that set fire to the ruins on that fearful night and sacrificed a hecatomb of victims. Blake & Darracott built the gas-works, which are very good. They are changing from iron to clay retorts, but of whose make, deponent saith not. The meters are from the Boston Meter Works of course, in part, also, in part, Glover's, of London, and Sam'l Down's. Use Pictou coal at $5 71, and Cannel at $11 84 per 2,240 lbs. Length of mains 7 miles, from 3 to 8 in. diam ter. No debt. Making money moderately. Gas purified with copperas and wet lime.

ORNE'S GAS BURNER—a very simple but effective burner, stuffed with *sawdust!* (probably the filings of wooden nutmegs)—the next will be with whittlings or ground white-wood Connecticut melon seeds. There is philosophy in this burner, nevertheless, and it emits a full and steady flame. On the whole, it is quite useful and decidedly Orne-amental.

MEMPHIS, TENN.—Dr. John Millington lately resigned the presidency of this gas company, and Mr. James M. Williamson was elected in his place. Mr. Thompson, Dean of Cincinnati, Ohio, is the principal man. The works were built by Mr. John Jeffrey, of Cincinnati, and art among the best in the country.

CHESTER, PA.—A snug little company. Use Merrick's iron retorts and Gratz's meters; have laid 5 miles of mains of 6, 4. 3 and 2 inches; loss by leakage 12 per cent. Use Virginia coal at $6 12 per 2,240 lbs.

EASTPORT, ME.—Works very good; built by Walker & Norton. Who are they? Length of mains but 2 miles, from 2 to 6 inches diameter Use Boston Meter Co.'s meters and Pictou coal at $4 75 per 2,240 lbs., and Albert at $12.

SUPERINTENDENTS OF GAS-WORKS.—Two applicants for situations in gas-works advertise to-day. One, a Boston Engineer, wishes to go South; the other is Mr. Charles Faben, for ten years in the Manhattan Gas Works in this city—a sufficient recommendation for any one.

NORWALK, O.—One of E. A. Coen's gas-works, with Thos. Hoadley's pyro-clay retorts. By-the-by we hear these retorts highly spoken of—why can we not see them in this latitude? Pittsburg and Stirling coal are used, costing, respectively, $4 and $3 50 per 2,000 lbs.

GALENA, ILL.—These gas works have lately passed into new hands, under the presidency of Mr. John Lorrain. They are now paying ten per cent. per annum. Coal used is from Lasalle, Ill.

BRATTLEBORO, VT.—Very small works, built by David Hill, use Pictou coal and rosin. Mains 2 miles long, 2 to 4 inches. Iron retorts, from Manchester Iron Co.

SENECA FALLS AND WATERLOO, N. Y.—Use Sterling coal. Length of mains 7 miles, from 2 to 6 in. diam.

THE CHAMPION DAY-LIGHT EXTINGUISHER.

In a recent number of the AMERICAN GAS LIGHT JOURNAL we gave a detailed account of the invention of Mr. H. K. Symmes for extinguishing street gas-lights by a gradual diminution of pressure at the works. Recent advices from England give us the particulars of a new method of putting out *private lights* by the application of increased pressure at short intervals and in quick and sudden strokes.

This process seems to be the joint invention of a couple of philosophers who have devoted their valuable lives to the elaboration of the science so recently and successfully developed.

Professors Heenan and Sayers, the inventors, gave a public exhibition of the apparatus and its application early on the morning of April 17th, 1860, at a place called Farnborough, in Surrey, England, in the presence of a large number of the top-crust nobility of England (earls and upward), several members of the House of Lords, temporal and spiritual, various nabobs and sundry nobobs, certain very common-ers, and a detachment (unattached) of the metropolitan police. The machine is called in scientific circles a "bunch of fives," of which each professor was provided with one pair, resembling in shape, color and appearance, before use, the well developed human fist. The lights to be ex ingished are technically known as "peepers," and it is by the ingenious and skillful application of the aforesaid bunches of fives to the aforesaid peepers that the desired results are obtained.

At the exhibition alluded to, Professor Heenan represented the American ma-sheen, and Professor Sayers the English bull-y. The "milling," as it is termed, was continued for some two hours, when the American lights became thoroughly obscured; but, as the American, notwithstanding he was in the dark in some respects, was evidently the champion in others, the mob put an abrupt termination to the proceedings by a concerted but fruitless effort to entirely close his windows by a promiscuous row. Professor Heenan, being a foreigner, will be unable to obtain the British patent he so richly earned; but it is probable that, on his return to his native land, (having temporarily left his country for his country's good) he will be awarded full indemnification for his invention, and for its application in foreign parts.

We omitted to mention that several other philosophers, well known in the same sphere of science, were present, viz., Professors Morrissey, Dad Cunningham, Pat Hughes, &c., and their impartial "wurdick" is recorded in favor of an American patent for Heenan's Champion Universal Day-Light Extinguisher.

P. S.—We notice that the London *Era* announces Mr. Heenan as having been born in *Benicia, in the Troy District of the United States!!!* We wish the printer to lead this P. S., and authorize the next geographer to copy it, without credit to us, the discovery being exclusively English, and suggest to the philosophers of the Title Manufactory in Great Britain that, in honor of the brilliant discovery made, as it is affirmed, *in the dark*, and without spectacles, the learned editor be raised to the dignity of *night-hood*.

THE SEWERS OF PARIS.

A correspondent of a Swedish journal furnishes an interesting account of a subterranean voyage made through one of the admirably constructed sewers of Paris. The boat which conveyed the party was reached by descending a flight of steps to a depth of about forty-five feet. The boat, a flat bottomed affair was lighted by four lamps. The sewer is in an archway, fifteen feet high, and of equal breadth, with a ditch or canal about ten feet wide, wherein all the dirt and filth of Paris is carried away. On the sides are sidewalks, which together are about four feet wide. The whole is built of beautiful white sandstone, and is kept remarkably neat and clean. No stench or bad smell was perceptible. The denser portion of the filth was carried away through large drains beneath the sidewalks. The sidewalks are excellent, and exhibiied no signs of dampness; while the walls of the archway are kept whitewashed, and are at all times as white as the driven snow. The structure possesses the properties of an immense speaking tube, the workmen being able to converse at the distance of two miles from each other. The echo is very strong and lasting. The fabric is said to be built after a model of the catacombs of Rome, aided by all the latest improvements. On both sides, at about two hundred yards distance from each other, are openings through which the workmen can ascend by means of permanent iron ladders, in case a sudden rain storm should cause the water to rise over the sidewalks, which is, however, of rare occurrence.

The contents of the sewer of course flow into the river Seine, and the current is sufficient to carry the boat used along with considerable velocity. Large reservoirs are constructed, at intervals, into which the water can be turned for a short time, in case it should be necessary to have the canal dry for a little while. The whole work was completed in two years. Besides the main canal, there are many minor ones constructed under the principal streets, all of which can be made to communicate with one another. These admirable underground works are accessible from the Louvre, the Tuileries, and from all the barracks, and should the Parisians take a notion to barricade the streets in any part of the city, the Imperial government might, at short notice, and without any person being aware of it, transport troops, and if there is time to make use of the reservoirs, so can cavalry also be transported the same way. There is an end to shooting on the soldiers fron the windows, and a revolution in Paris will soon only be remembered among things that have been, never to occur again. Through these underground passages, a prisoner can easily be taken from the Louvre to the Seine, without attracting attention, and thence sent off by railway, which is near at hand.

WATER FOR ENGINE BOILERS.

There are certain subtle agencies at work in all forms of matter which are far more perplexing to the engineer than the bolder and apparently more formidable opposition of gravity and the intractability of materials. Expansion by heat and contraction by cold is an ever prevalent example. With each going down of the sun, buildings, bridges, railways and machinery change their form; at every breaking of the clouds they warp and dilate with each new degree of temperature. But in case of mechanism, where not only extreme accuracy is essential, but where the expansion due to a high artificial heat must be provided against or compensated for, the whole design of an otherwise perfected apparatus may require modification and new adaptation. This illustrates the character of these unostentatious, but never tiring agencies which dispute each inch of ground with man, in the irrepressible conflict of mind with matter.

But this is not the only adverse result of the action of heat. Water is a universal solvent and carrier. From the moment it strikes the earth in rain, it begins its depredations—nothing too yielding to elude its grasp, nothing too hard to resist its touch. As it sparkles from the spring, it is saturated with the element of earth and rocks; as it ripples in the brook, it takes up new materials, both chemically and mechanically; and as it rolls along with the river, it becomes dark and choked with the spoils of earth and trees and *débris* of the shores. And in this very fullness of impurity it is impressed into the service of commerce, and turned into the steam-boiler. With ready adaptation to its new offices, it speedly drops the treasures and playthings of its free state, explodes into vapor with its newly-acquainted heat, and performs its wonderful feats of expansion and condensation. It drops its spoils of earth and rocks and vegitation, and it is not choice in its locality of deposit. It plasters its lime and soda and silex over fire-plates and tubes; it lets go of its mud and vegetable matter at the first approach of its new partner, caloric; and one of the most difficult problems in the whole science of steam-engineering is the result of its fickleness. When these extraneous matters are introduced into steam-boilers, a part of them settle into a thick hard mud at the bottom, others are distriuted by the circulation all over the heating surface, where they soon form a hard scale like the lining of stone, and others, especially vegetable matters, aggrevate the formation of foam—mixed water and froth and steam—a part of which going over into the cylinders, where it does no good, but, in large quantities, does great harm—wastes the heat imparted to it. But the incrustation or scale is the chief disadvantage of impure water. Being a non-conductor of heat, it prevents that imparted to the metalic surfaces from being readily taken up by the water. Standard authorities report that one-sixteenth of an inch of scale is equivalent to a loss of 14·7 of heat or of fuel. The plates of a boiler never get hotter than the water when in contact with it, whatever may be the outside temperature applied; and the water never gets hotter than some 300 degrees under 100 pounds of pressure. So clean boiler-plates are preserved for years. But when coated with scale, and thus removed from direct contact with water, they get so overheated as to rapidly deteriorate in quantity and quality. This burning out of boiler plates, particularly where bad water and coal are used—the heat of the latter being more concentrated than that of wood—is one of the chief items in railway repair accounts. The increase of repairs is often 25 per cent. from this cause. But the cost due to this incrustation is not its chief disadvantage—it is a source of positive danger. When the scale gets thick, and the plates consequently very hot, the former is liable to crack off bringing the water in contact with over-heated metal, and thereby causing explosions. There are very few localities in which the water is pure enough to prevent serious and considerable difficulties from the formation of scale. In Ohio, and in the West generally, the water spaces of boilers would fil entirely full in a few months, were it not for repeated blowing and washing out. On the Mississidpi the trouble with mud is very great. Boilers are provided with mud collectors, where the impurities are taken up from the circulation and allowed to settle. Locomotive and stationary boilers are drawn off and washed out, by means of a hose, every few days. With all these precautions, a large amount of scale forms on the heating surfaces, and in time burns out the boilers. Cleaning them with scrapers and chisels is often resorted to, but this, in any case, is liable to cause leakage, and with small boilers impossible. In marine engineering, the deposit of salt is the direct and indirect cause of the consumption of at least twice the fuel that would be necessary with fresh water. Steamship boilers must be blown off constantly, and even then soon burn out. The great problem of surface condensation, however, is at this department. For preventing the bad effects of fresh water deposits—principally lime in some combination—two processes are employed: the first not to any great extent, because it is expensive—the purifying of water by heat and combined mechanical and chemical means, before it is put into boilers. The second is the use of some chemical agent *in boilers* for removing the scale as fast as it forms, or for preventing its formation. In but very few instances has the latter process been the result of direct chemical analyses, but rather of partial experience and caprice. Few of the specifics offered to the public have been of much advantage. Some scores of patents have been granted for the same purpose, most of which have not been heard of in practice. A signal trouble with most of them has been that during their application the boilers have "foamed" so badly as to render efficient and safe working impossible. Others have injured the boiler, corroding both copper and iron.

Such being the great necessities of the case, he introduction of an efficient material, which shall be at once harmless to everything but the scale, and not unreasonably expensive, is a matter of universal importance. This is a case in which not only inventors, but engineers themselves, are liable to be led astray. What appears to work well for a few months is not certain to succeed in the end. The improvement which we purpose mentioning is one which a long and very extended experience has established, beyond the probability of failure. Should it in any case fail, so assured and numerous have been its former good results, that we should be disposed to attribute it to mistake in the composition itself, or to the entrance of some new chemical agent, rarely met with, in the water which supplies boilers.

Mr. H. N. Winans, of this city, prepares a composition, as to which we purpose only to speak of its effects, for the good and sufficient reason that its ingredients and proportions are known only to the inventor. And so long as he succeeds in keeping boilers clean at a cost of from six to twelve cents a day, it is to be hoped that pirates will not deprive him of the results of many years of unrewarded labor, should they find this possible. Mr. Winans' composition has been used for some years on such leading railroad lines as the New York Central, New Jersey, Michigan Central, and many others. On the first named, it is reported to keep the boilers perfectly tight as well as clean even in the crevices. On the Virginia and Tennessee line, where the water is especially bad, a quarter of a pound every other day prevents the formation of scales.

Mr. Shield, chief engineer of the CINCINNATI WATER-WORKS, in his published report, says of the composition, that its success "has been of the most vital importance to the works (boilers and pipeing) for their economy and preservation, and the use of the material is amply repaid by its economizing in the amount of fuel, and its preservation of boilers from early decay."

This is the general result of its use—entirely preventing scale, without injuring the boiler plates. As to the latter results, we have seen pieces of copper, iron and brass that have been boiled for weeks in a much stronger solution of the composition than could practically occur in a boiler, without observable change, and without measurable loss of weight.

All owners and managers of steam-boilers very well know the importance of an agent of this nature, and should the composition mentioned continue to act as it has done for some years, and there is no possible reason to anticipate failure—it will certainly prove of the highest importance to one of the greatest interests of the country. We should mention the fact that Mr. Winans' composition is not adapted to boilers using salt water. for marine purposes, we know of no system but surface condensation—the repeated use of the same distilled water—that is likely to accomplish the desired end. And for this purpose, the indirect results are more important even than the direct results. The use of fresh water permits the use of small boilers, and may economize three-quarters of the weight and space of ordinary boilers, besides allowing the immense advantages of high-pressure steam.

A CHANCE FOR GAS CONSUMERS AT LAST.—Grace Church is about erecting a free chapel in Fourteenth street, near the New York Opera House, ostensibly for the benefit of the poor in that vicinity, but as there happen to be none belonging to that category in the immediate neighborhood, it is now pretty well understood to be intended as a Mission station for the Manhattan Gas-Light Company. There are about one hundred officers and clerks, and perhaps three hundred stockholders connected with that mysterious institution, who with another hundred injured gas consumers, will comfortably fill the chapel. We think the engineer requires looking after first, for of all the complaints made against the establishment, that of "pumping atmospheric air into the mains" is the loudest, and belongs specifically to his department, and even if the gas does burn with seventeen candle brilliancy, there is no excuse for his serving skim-milk for rich cream. We look to the Mission for great results in its effect upon the gas bills and the gas.

A bachelor gas-engineer at our elbow, enquires what the indignant young-lady gas-consumers will do, when they attend the Mission Chapel? We suppose they will do as all devotional young-lady church-goers do—look out the *hims*.

THE NEW LOCOMOTIVE LIME-LIGHT.—For some time past a locomotive on the New York Central railroad has carried a lime-light, which is as superior to the ordinary lights used as the electric light is superior to an oil lamp for a lighthouse. The locomotive starts out with two small tanks a foot in diameter and three feet long, into which the oxygen and hydrogen have been pressed until the guage shows a pressure of from 70 to 100 pounds. While the train is in motion the engineer can turn on the light and light it; the regulation is entirely automatic. The light is the invention of Dr. George Hand Smith, of Rochester, N.Y., and it will soon be exhibited at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

GEORGE WRIGHT & CO.'S

LIVERPOOL AND NEWCASTLE CANNEL AND COAL

FOR GAS MANUFACTURE AND HOUSE USE.

THE undersigned does not submit for comparison the result of chemical analysis, as this plan is too often adopted to promote the sale of inferior or worthless coals that in practice bear no particle of resemblance to their theoretical, and sometimes distorted descriptions.

He is authorized, however, to guarantee the *careful shipment of the best qualities of Cannel and Coal, at the lowest rates of Invoice and Freight offered at time of engagement;* and any losses sustained by short weight, or the neglect of the conditions mentioned, will be promptly and cheerfully repaired.

OFFICE OF THE MANHATTAN GAS-LIGHT COMPANY,
New-York, October 8th, 1859.

Messrs. GEORGE WRIGHT & Co., Liverpool:

Gentlemen,—For many years you have acted as agents for this company, purchasing for, and forwarding to them, coals, retorts, and other gas apparatus.

Your experience, ability and sterling integrity, entitle you to and have secured our confidence, and we cheerfully recommend your house to all gas companies desiring the services of an agent in England. My own personal knowledge of the superior quality of the coals within your control, and my acquaintance with the manufacturers of such articles as can be advantageously procured by you in England for gas companies abroad, added to my high regard for you personally, induce me to write this letter, and express the hope that you may be able to extend your business in this country, not only for your own advantage, but also for the benefit of those who may confide in you as securely as we have done.

I am, gentlemen, your very obedient servant,

CHARLES ROOME, *President.*

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PETERS' NEW PORTABLE GAS-Light, for City and Country. Chandeliers, Pendents, Brackets, and Table Stands, for sale at No. 476 Broadway. State and county Rights for sale. R. R. LEWIS, Agent.

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THE PARAGON, Self-Generating Hand Gas-Light Burner, BUTLER, HOSFORD & Co., Proprietors, 30 Broadway, New York, and 2 Court street, Brooklyn, N. Y.

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STOKERS' GLOVES, AND LONDON BOOKS on Light.—Just received from London a large supply of stout Gloves, for Stokers in Gas-Works. Also, several works on Light, illustrated by engravings and photographs. HORATIO EAGLE, Ag't, Rooms of American Gas-Light Journal New York.

STATE OF NEW YORK, Office of Inspector of Gas-Meters, 561 Broadway.—Gas-fixtures, Paris Bronzes, Parian and Bisque Figures, Fancy Goods, &c., and Gas-Fitting in all its Branches.
NEW YORK, May 21, 1860.

TO SOUTHERN GAS-LIGHT COMPANIES and Contractors, about Putting up Gas-Works in Warm Climates.—The undersigned is prepared to furnish, at a very considerable discount, for cash, a large number of Wet and Dry Gas-Meters, each of which have passed inspection by the State Inspector. HORATIO EAGLE, Agt., 254 Canal-st., N. Y.

SCOTCH BOG-HEAD COAL.—1000 Tons of this Superior Coal, for Gas and Oil-making purposes. For sale by HORATIO EAGLE, Agt., 254 Canal-st., N. Y.

H. P. GENGEMBRE'S PATENT Non-Freezing and Non-Evaporating Gas Meter Fluid.

A meter once filled with this fluid, costing only from 10 to 15 cents per gallon, will require no further attendance; will allow any amount of gas to pass through without affecting the level of the Fluid, and will work equally well in winter or summer, however exposed it may be.

I have appointed A. L. BOGART, No. 592 Broadway, New York City, my Agent for the New England States and the State of New York; and A. DOISY, Box 1180, Cincinnati, O., my Agent for the balance of the United States; but no assignment or licenses for using my patent will be valid without being ratified and signed by myself.

H. P. GENGEMBRE,
Box 48, Alleghany City, Pa.

LAND IN CANADA, for Gas-Light Shares.

Town of Coburg,	Northumberland Co.	14 acr's	
Do Hamilton,	do	do. 100	"
Do N'th Monaghan,	Peterboro'	do. 600	"
Do South	do	do. 100	"
Do Dummer,	do	do. 100	"
Do Douro,	do	do. 223	"
Do Haldimond	Northumber'nd	do. 200	"

These lands are well located, and will be exchanged on equitable terms for sound, dividend-paying gas-light shares in the United States or British Provinces.

Apply or address E. R. L., Post-Office, Toronto, Canada, or at Rooms of AMERICAN GAS-LIGHT JOURNAL, New York.

OFFICE OF THE NEW YORK Gas-Light Company, April 23, 1860.—The President and Directors have this day declared a semi-annual Dividend of Ten Dollars per share on the capital stock of this Company, payable to the Stockholders on and after Tuesday, 1st May next. By order.

C. L. EVERITT,
Secretary.

GAS FIXTURES at Half Price—A Pair of Four light English water-slide Chandeliers, fushia flower pattern, white and gold enamelled drops, &c. Will be sold at half the cost of importation any time before Saturday. Apply at 13 Gold Street, up stairs.

PARAGON SELF-GENERATING

GAS-LIGHT BURNER.

Complete in itself, without other machinery. Applied with founts to gas-fixtures in every variety; also, to hand-lamps such as use oil, burning fluid, coal oils, &c., making its own gas in the burner, *with entire safety from burning fluid.* Devoid of smell, smoke, or flicker; combining simplicity, economy and brilliancy of light in any temperature; adapted to and used by churches, factories, dwellings, hotels, steamers, railroad cars omnibuses, private carriages, street-lamps, &c., &c.—all at an expense of less than one cent per hour each burner. Call and see this light for the million, or send for circular,

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ALSO,

Portable Gas-Works of all Descriptions. Also, Water-Pipes, Water-Meters, Force-Pumps,

AND ALL OTHER WATER APPARATUS, AND FIRE-CLAY SEWERAGE PIPES.

STREET GAS-LANTERNS.

Cities and Gas Companies furnished at reasonable rates with Lanterns, Iron Frames, Grazed Complete or Separate. Also, Fancy Lanterns, for Hotels, Restaurants, Theatres, Telegraph Offices, Churches, and other Public Buildings. Having been in the business for many years I fully understand the manufacture of Gas Lanterns, and with the aid of machinery can make the parts cheaper than any other manufacturer. Orders from a distance solicited, and executed promply.

A. C. PARRY,

31 Race Street, Cincinnati, Ohio.

ENAMEL DIALS FOR GAS AND WATER METERS.
BOTTOMLEY & HINES, MANUFACTURERS, West Philadelphia, Pa.

The best, therefore the cheapest for Gas and Water Meters and Engineers' Indicators.

These Dials are particularly adapted to all purposes where gas, gas-vapors, or acids, are present. Also, Watch and Clock Dials of every description, from any size up to 14 inches diameter.

The undersigned embrace this opportunity of returning their thanks to the gas-meter manufacturers throughout the United States, for the very liberal patronage they have received for the past ten years, during which they have been established in Philadelphia, which has placed us ahead of all competition. Our sales for the past year have been far greater than we could have anticipated, with the prospects of a steady increase. Our constant aim has been, and will be, to adopt all improved processes of manufacture, combining improvement in quality with reduction in price All Dials made by us are warranted to be as represented, and of the best materials and workmanship, which will recommend them to all parties wishing the very best. Circulars sent free by mail, or on application

We are the appointed agents for HUNTER, SHEARMAN & CO.'S make of BRASS PINION-WIRE for Gas-meters, which we believe is equal to the best.

Howe's Improved Standard Scales.

These Scales have become largely in use in this city and vicinity. Their principal advantages are:—That they require no pit; have no check rods; Will weigh when out of level; Receive all the wear on chilled iron balls; They are very compact, and easily transported. These Scales are not only warranted to be accurate and durable, but are warranted to give entire satisfaction, or they shall be taken back without charge.

Gas-Light Companies are invited to examine references and a large stock of Scales.

Lillie's Safes.

Are a combination of Wrought and Chilled Iron, made in only two castings or pieces, one being the Safe, the other the door. As an evidence of their merit, I would state that 243 of these Safes have been made for various Banks throughout the country, within the last two years, and over 40 are now in use in the New-York city Banks.

I have sold 90 of these Safes to New-York City Merchants within the last three months. An examination is invited to a large stock.

FRANK E. HOWE, 203 Broadway, N. Y.

THE AMERICAN PUMP. This valuable invention has now been in operation one year, and gives universal satisfaction. Drawings and prices sent free. Patent rights, and rights to sell in limited territory, for sale on good terms. Address JAMES M. EDNEY, No. 147 Chambers' street, New-York. One of these Pumps may be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL. For Engravings, see page 188 of this JOURNAL.

DIMMOCK, DWIGHT & CO., Engineers and Contractors for the erection of Coal Gas-Works. Offices 135 and 137 William street, New York city; and No. 2 Elm street, Springfield, Mass.

REFERENCES BY PERMISSION:
GEORGE D. MORGAN, Esq., New York.
AARON CLAFLIN, Esq., "
A. B. WOOD, Esq., "
GEORGE BLISS, Esq., N. Y., Pres. M. S. & N. I. R. R. Co.
GEO. M. ATWATER, Esq., Springfield, Mass.
JAS. D. BREWER, Esq., Pres. Springfield Gas Co.,
JOHN I. BAKER, Esq., Pres Beverly Gas Co.,
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J. DUNHAM, Esq., Pres. Norwich, Ct. Gas Co.,
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E. A. COEN, ENGINEER AND Contractor, for the erection of Coal Gas Works.

Plans and specifications furnished and Works erected for cities, towns and villages. ROSIN WORKS altered and repaired. Pipe, &c., furnished and laid for Water and Gas.

E. A. COEN, Rondout, Ulster Co., N. Y.

PORTABLE GAS WOKS.—Hotel Keepers, Manufacturers, Sugar Planters, Private Individuals, and others throughout the United States, the Canadas and Spanish America, contemplating the erection of Portable or Private Gas-Works, on furnishing the undersigned with the number of burners intended to be used, and whether coal or rosin works are preferred—will be supplied with estimates, and every information as to the latest improvements in the same.

HORATIO EAGLE,
Rooms of the AMERICAN GAS LIGHT JOURNAL,
No. 254 Canal street, near Broadway,
New York.

C. R. WOODWORTH, Manufacturer of Portable Gas-Works No. 1 Cedar st,, near Pearl st., N. Y. city.

SCHWARZ'S PATENT STEA-tite, or Lava Gas-Burner Tips.—These obtained a Gold Prize Medal in Europe, where they are now extensively used in place of metal tips. In Prof. Liebig's and other Chemists' works, these burners are recommended as *indestructible by acids or alkalies, unchangeable by heat or cold, not liable to rust or corrosion*, and superior in economy to the metal tips. Boston and other cities have adopted them for street lights after a satisfactory trial. They are imported from Germany by the undersigned, sole Agent for America, who can now supply the trade or cities at reduced prices, with any pattern of tips to fit the double cylinder or other kind of burners. For sale also, Large Gas Heating Burners, of same material, for Chemists, &c. W. W. WARREN,
25 Kilby street, Boston.

Cast Iron Street Lanterns, neat and very durable.

For sale by JOHN JEFFREY, Cincinnati, Ohio.

Street Lanterns cast in three pieces, which are fitted together without bolts, rivets, solder or other fastenings; glazed without tins, putty, or catches; the glass slipping into grooves cast in the lantern. These lanterns have been adopted, and are now used, by the City Councils of Cincinnati, O., Covington, Ky., and other cities.

BRADBURY M. JOHNSON, GAS-Fitter and Plumber, No. 111 East Eighteenth street, New York.

A large and elegant assortment of CHANDELIERS, BRACKETS, &c. Gas-Pipe and Posts made for Gas Companies on favorable terms.

Gas Fixtures and Fittings. RINGUET-LEPRINCE & L. MARCOTTE, Warehouse, 347 Fourth street.—Manufactory, 55 West Sixteenth street, New York.

RINGUET-LEPRINCE, 3 Rue de la Paix, Paris.

Painting, Paneling, Cabinet Work, Looking Glass Plates, Mirror Frames, Silk, Worsted and Woolen Materials, Aubusson and Moquette Carpets, Gas Fixtures, Bronzes &c.

GEORGE H. KITCHEN & CO., Manufacturers of Fixtures for Gas Light purposes, Wood's Building, No. 561, Broadway, New York. Office of the Inspector of Gas Meters for the State of New York.

H. R. WORTHINGTON'S Pa-tent Water-Meter.—This Meter combines accuracy, simplicity, and remarkable durability, with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities with its low cost, have caused its extensive adoption by corporations and individuals in many of our largest cities. Particular information can begiven at the office of the undersigned, where a Meter can be seen in operation.

For sale, at greatly reduced prices, WORTHINGTON'S STEAM PUMPS, extensively used by Gas-Light Companies. Also, a new and highly successful PUMP, driven by water-pressure, requiring no attention or repairs, and the most economical water-motor yet constructed.

Patent GATES, for Water and Steam-stops
HENRY R. WORTHINGTON,
28 Broadway, N. Y.

One of these Water-Meters can be seen in operation at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

BOSTON GAS-METER WORKS.— J. R. DARRACOTT, Agent,
No. 332 Washington-street, Boston.

Gas-Meters, of all descriptions, and most approved construction, constantly on hand. Proof Meters and Station Meters, of superior workmanship, made to order.

GAS-APPARATUS FOR CARS. S. B BOWLES, No. 12 Gold street, New York, Manufacturer and Dealer in Railroad Supplies, including GAS APPARATUS FOR CARS, of the most approved design.

NEW YORK BELTING AND Packing Company, Manufacturers, under Goodyears's Patent, of VULCANIZED RUBBER FABRICS, adapted to mechanical purposes, Machine Belting, Steam Packing, Hose, Gas-Fitting, &c., Nos. 37 and 38 Park Row, New York.

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MANUFACTURERS AND DEAL-ers in Boynton's Furnaces, Bullard's, Steam Heaters, Morning Star, and Pierce Ranges, Stoves, &c., No. 260 Canal street, a few doors east of Broadway, New York.

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TO GAS-LIGHT AND WATER Companies:

SARONY, MAJOR & KNAPP, practical Lithographers, Engravers and Printers, No. 449 Broadway, design and execute CERTIFICATES OF STOCK for Gas and Water Companies; also, CHECK AND NOTE BOOKS, with Vignettes of Meters, Gas-Holders, Reservoirs, &c., and all other special and commercial work, at the lowest prices.

NEW YORK FIRE-BRICK Manufactory. (Branch Works at Kreischerville, Staten Island.)

B. KREISCHER & CO., office 55 Goerck street, corner Delancy street, New York.

GAS-HOUSE TILES and FIRE BRICK of all shapes and sizes. FIRE MORTAR, CLAY, and SAND articles of every description made to order at the shortest notice.

B. KREISCHER, M. MAURER, A. WEBER.

LESTER'S SEWING MACHINES, Lock-Stitch, prices from $50 to $150. No. 483 Broadway, New York. Adapted to family use—doing light as well as heavy sewing.

GROVER & BAKER'S celebrated Noiseless Sewing Machines, at greatly reduced prices, No. 495 Broadway, New York.

THE WILLCOX & GIBBS' FAMI-ly Sewing Machines. The best family machine in the market, prices from $30 to $50. 504 Broadway, New York.

WHEELER & WILSON'S Sewing Machines, No. 505 Broadway, New York. The very best in use. Send for a circular.

NORRIS & GREGG.
DEALERS IN WROUGHT IRON Pipe, and Manufacturers of Fittings for Steam, Gas, and Water, Nos. 62 and 64 Gold street, (between Beekman and Fulton streets,) New York.

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SEYTON & WAINWRIGHT, 37 William street, New York city, Sotck and Exchange Brokers, General Railroad and European Agents. Stocks and Bonds bought and sold at the Board of Brokers, and at private sale. Railroad and other loans negotiated, and collections made for home or European account. *Exchange on London.*

C. S. SEYTON, J. H. WAINWRIGHT.

REFERENCES:
Duncan Sherman & Co., Richard Irvin & Co., John R. Murray, and Union Bank, New York; Webster Bank and Peter Wainwright, Esq., Boston; E. F. Satterthwaite, London; Alfred F. James, Galveston, Tex.; Ogden, Fleetwood & Co., Chicago; Erastus Corning, Esq., Albany; W. Fisher & Son, Baltimore; J. P. Kilbreth, Cincinnati; G. Parish Ogden, Troy.

TIFFANY & COMPANY, Jewelers and Importers of elegant artistic PARIS GAS CHANDELIERS, BRACKETS, PENDANTS, &c., in Bronze and Gilt.

No. 550 BROADWAY, NEW YORK.

CAST IRON WATER, GAS, DRAIN, AND HEATER PIPES, &c.,
COLUMBIAN IRON WORKS,
OFFICE, No. 46 NORTH SEVENTH STREET,
Below Arch street, Philadelphia.
THOS. M. ADAMS, Proprietor.

FREEZING OF GAS-PIPES.— Walton's Patent Anti-Freezing Apparatus illustrated by engravings, in the AMERICAN GAS-LIGHT JOURNAL, of Jan., 1860, page 141, is the most simple, durable and efficient of any known process.

According to Professor Faraday, the watery vapor contained in illuminating gas amounts to 0·0093 parts where the gas is at a temperature of 40°, or in other words, that there are 1. 7-10 *gills water in every* 1,000 *cubic feet of gas* at that temperature. It is the deposit of this water in the form of frost that closes the exposed pipes.

Walton's plan is, in a few words, to supply this water with a sufficient quantity of alcohol (98-100ths), the vapor of which will enable it to pass through the most exposed pipes, unaffected by frost. Experiments of three years prove that one gill of such alcohol will protect 1,000 feet of gas at any temperature. Private houses, Hotels and Gas-works, can be thus guarantied from frost by the use of Walton's Anti-Freezer, which consists of but two or three small castings, at the most trifling cost. It can be applied at Gas-works without altering any of the pipes; and the expense of labor and the alcohol will not exceed two cents per 1,000 feet of gas.

It can be seen in operation at the rooms of the AMERICAN GAS-LIGHT JOURNAL, where orders will be executed at once.

Read the Following Testimonials:

GAS-WORKS, CINCINNATI, O.,
24th May, 1858.

MR. JOHN WALTON,
Louisville, Ky.:

DEAR SIR,—At an earlier date, I intended to have written you the result of my experience during last winter, in regard to your patented apparatus to prevent the freezing of gas in pipes. I am quite convinced that both in theory and practice your apparatus is correct, and in no case will it fail to prevent the freezing in pipes of our illuminating carburretted hydrogen gas, provided attention is paid to renew the alcohol often enough in proportion to the amount of gas passing through the anti-freezing apparatus.

Yours truly, JOHN JEFFREY.

OFFICE LOUISVILLE, KY., GAS CO.,
March 30th, 1860.

In the winter of 1856, this Gas Company first applied John Walton's patent method for the prevention of Frost in Service Pipes,—to this date we have used it with perfect success. *This Company have Purchased the Right to this Patent for Louisville, Kentucky.*

The application of a vessel, containing a small quantity of alcohol, placed between the gas main and an open area connected with a building, through which the service pipe was laid, has always prevented the freezing or stoppage of the service pipe, although the temperature may have ranged from the freezing point to several degrees below zero.

As the alcohol absorbs from the gas any vapor of the water that may be passing off with it, after passing the vessel containing alcohol, there remains in the gas nothing that can freeze or close the pipe. *This simple application, we have proved to be an effectual safeguard against the closing of gas pipes with frost.*

ROBERT G. COURTENAY,
President.

DRAIN-PIPE. JAMES P. HAMMILL, Importer and dealer in best English FIRE-BRICK, FLOOR, MALT, AND ROOFING TILES, DRAIN PIPE, GAS PIPE, &c.
155 Water street, New York City.

HENRY G. NICHOLS, 24 Pine Street, up stairs, Room No. 5, New York. Manufacturers' Agent for the Sale of Cast Iron Pipe, Bends and Branches for Gas or Water, Retorts, Lamp-Posts, Lanterns for Gas Lamp-Posts.

DAVID JONES.
ORNAMENTAL JAPANNER, South-west corner of Ninth and Melon streets, Philadelphia, respectfully solicits a liberal share of patronage from the manufacturers of Gas-Meters and others He is prepared to execute all orders for Japanning promptly and reasonably.

Reference—Cope, Hopper & Gratz, Gas-Meter Makers, Phila.

GAS-LIGHT STOCKS FOR SALE. THREE HUNDRED THOUSAND DOLLARS of Stocks in various Gas-light Companies in the United States, paying from 6 to 12 per cent. dividend, for sale by

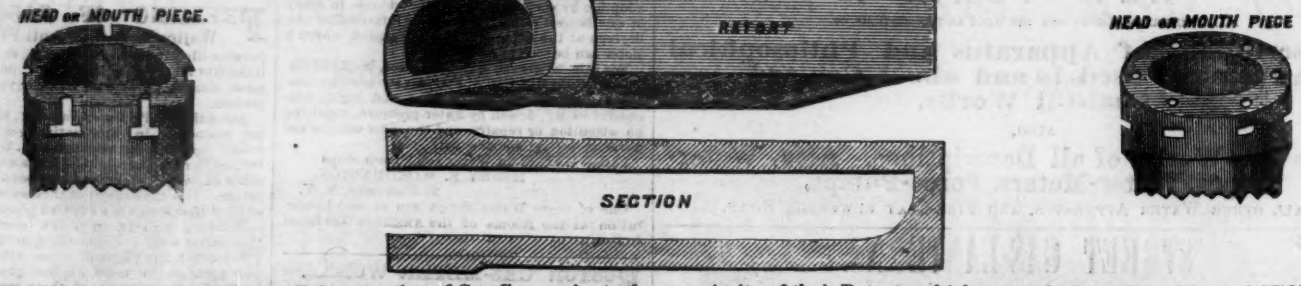
JOHN B. MURRAY,
Rooms of the AMERICAN GAS-LIGHT JOURNAL.
New York.

The Advertiser has been attached to one of the largest Gas-Works in the United States, for the past ten years, and is now desirous of engaging with any Gas Light Company, requiring the services of a superintendent. Reference can be had by addressing F. C. R., at Rooms of the AMERICAN GAS-LIGHT JOURNAL, New York.

Engineer's Situation Wanted at the South. The undersigned who has had seven years experience in building and managing Gas-Works, desires a situation at the South to superintend Gas-Works, the health of his family compelling him to leave the North. Salary expected, moderate. Address, B. H. G., at Rooms of the AMERICAN GAS-LIGHT JOURNAL, New York.

KING BROTHERS,

STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

FREE FROM CRACKS AND CORRECT IN FORM.

By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABBITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

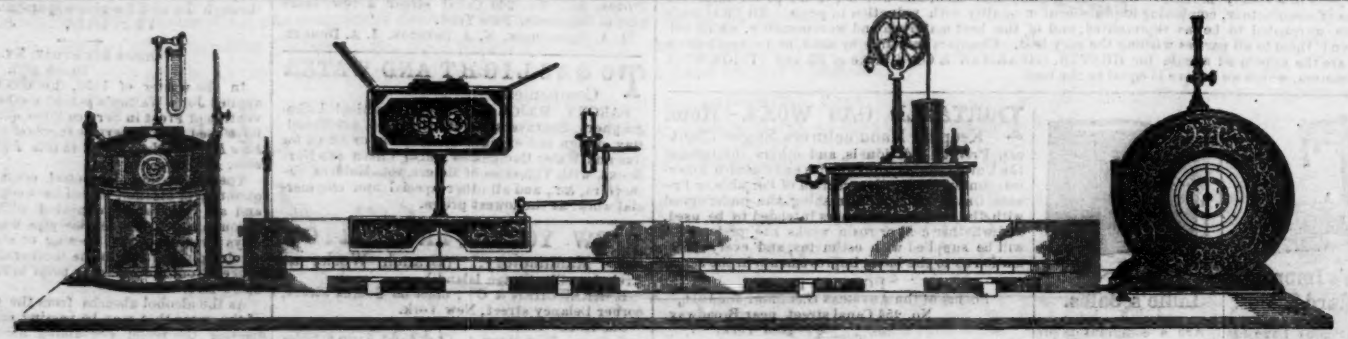
EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS. STOURBRIDGE."

ELLIMAN BROTHERS, 217 Pearl Street, NEW YORK,

Importers of Belgian Fire-Clay GAS-RETORTS,

AND DEALERS IN TILES, ARCH-BRICKS, FURNACE-DOORS, MOUTH-PIECES, COVERS, AND ALL OTHER FITTINGS, OF MOST APPROVED PATTERNS, FOR SETTING CLAY RETORTS EXHAUSTERS, COMPENSATORS, VALVES, &C.

IMPORTERS AND DEALERS IN WROUGHT-IRON GAS, WATER, AND STEAM TUBES.



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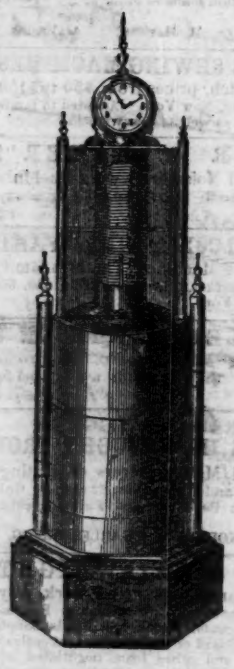
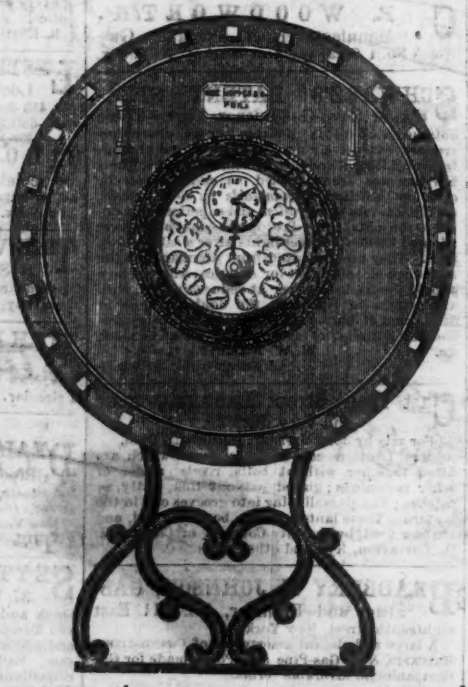




CUSTOMER METERS,
(Wet and Dry.)

EXPERIMENTAL METERS,
(Wet and Dry.)

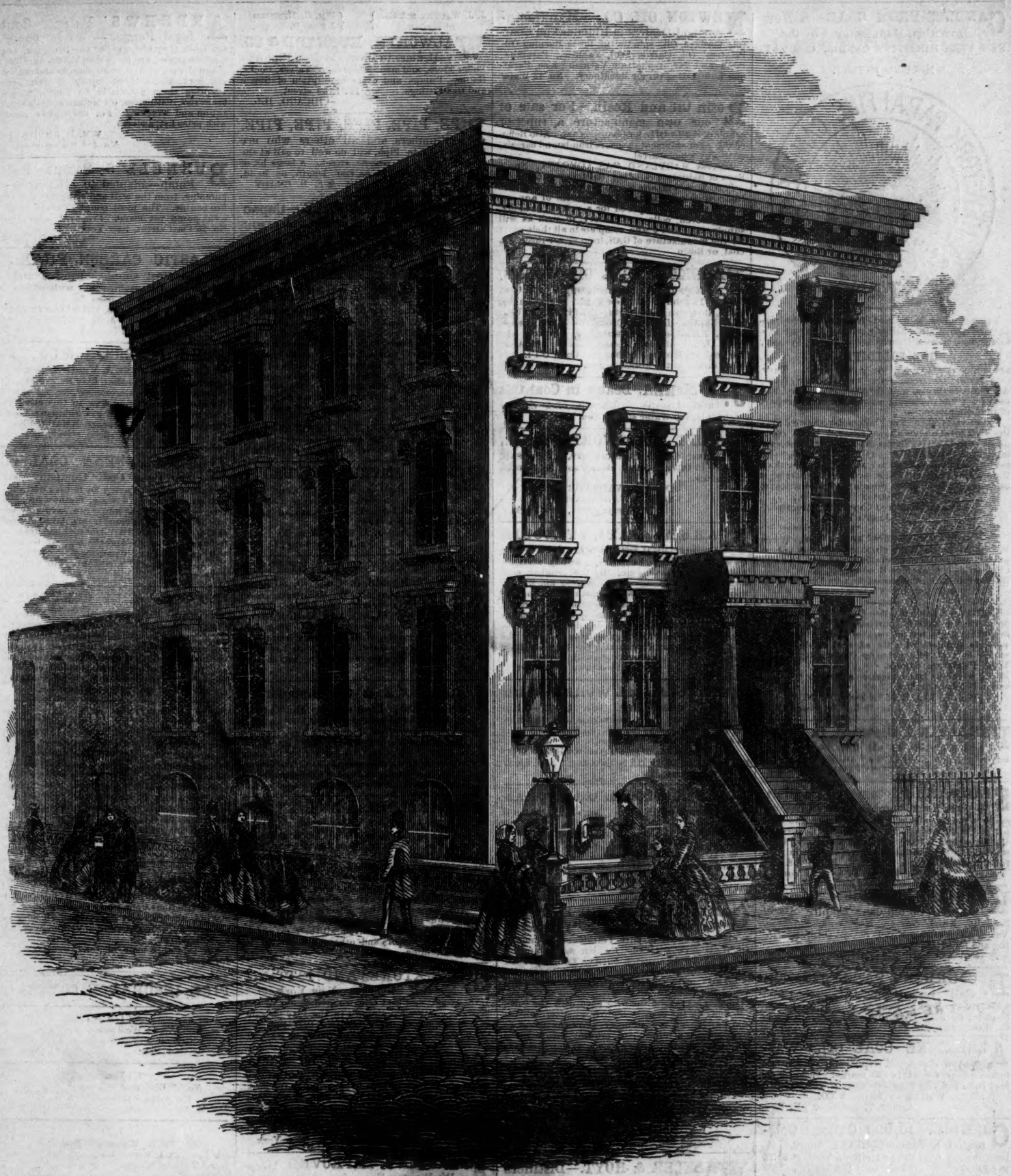
HOW METERS,
(Wet and Dry.)

METER PROVERS,

CENTRE SEALS,
&c. &c. &c.

THE high reputation which we have enjoyed for more than twenty-two years, and the fact that we have manufactured a greater number of Gas Meters than all other manufacturers in this country combined, must present itself as a security to parties desirous of securing the most reliable instruments. Having completed an extensive addition to our factory, and added many important improvements to our machinery, we are enabled to fill orders entrusted to us with dispatch, and in all cases *guarantee entire satisfaction*. Our Patent Rotary-Valve Dry Gas Meter is now used by upwards of two hundred gas companies, giving general satisfaction ; we therefore recommend it, believing it superior to any other Dry Gas-Meter manufactured. All meters tested separately by a sworn Meter Inspector, and sealed when desired.

CODE, HOPPER & GRATZ,
1500, 1502 & 1504 FILBERT STREET,
PHILADELPHIA



THE TWO GREAT PATENTS OF THE DAY.

1.—Improved Mode of Setting Gas-Meters in the Walls of Buildings.

2.—Cast-Iron Mail-Stations for Public Lamp-Posts.

Adopted by the UNITED STATES GOVERNMENT for the Principal Cities.

ALBERT POTTS, Philadelphia, Patentee.

By the FIRST IMPROVEMENT the Meters may be inspected at any time from without, by the agents of the Gas-Company having keys for that purpose. Thus burglars need no longer gain admittance to dwellings under pretense of examining the meters, while they, in fact, examine the fastenings. The meter-box, being neatly and securely imbedded in the front wall, the meter is protected against frost by means of a thick pad on the back of the door. It has been satisfactorily tested in long continued severe weather and found to be eminently successful.

The SECOND IMPROVEMENT speaks for itself. The cities of New York and Philadelphia are already supplied with these boxes, and the convenience to the citizens and increase of revenue to the Post-Office Department are most marked. Always in sight, securely fastened to the most public objects, protected by light, day and night, they have become the most popular of all modern improvements and will be immediately adopted throughout the country.

Both of these improvements are to be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, New-York City. For further information address the Proprietor of this JOURNAL, who is authorised to contract for the use of both Improvements, or

ALBERT POTTS, Philadelphia.

CANDLES FROM COAL.—A New Invention, Manufactured by the NEW YORK PARAFFINE CANDLE COMPANY, UNDER MEUCCI'S PATENT.

These Candles being made from one of the products of the distillation of Coal, and having the same chemical constituents as gas, being, in fact,

GAS SOLIDIFIED,

are eminently adapted for giving light. They took the highest premium at the late Fair of the American Institute, held October, 1859, as may be seen from the following extract from the report of the Committee:—

"Our tests with the Photometer showed that the Paraffine Candles above referred to, as compared with the best Sperm, had greater illuminating power, gave a softer and pleasanter light to read by, and burned full ten per cent. longer than the standard Sperm Candle, and we recommend it as deserving the highest premium of the Institute.

"ISAIAH DECK, M. D.,
"Analytical and Consulting Chemist
"JOSEPH YATES,
"Civil Engineer."

The Candles manufactured by this Company are warranted to stand all climates, will not run or gutter, and require no snuffing, and, unlike some other so-called Paraffine Candles,

DO NOT SMOKE IN BURNING OR BECOME YELLOW WITH AGE, AND ARE WITHOUT ODOR.

CAUTION.—As an Imitation Candle is already offered in the market, purchasers should bear in mind that every box of Candles sold by this Company is stamped with its adopted trade mark, which is a circle, enclosing the words, "NEW YORK PARAFFINE CANDLE CO., MEUCCI'S PATENT, 1859," with our trade mark as above, to imitate which is felony by law.

WM. E. RIDER, 16 Beekman-st., N. Y.,
Agent for the Company.

PARAFFINE, Bleached, in Cakes, and Candles of all brands, for sale by HORATIO EAGLE, Agt.,
254 Canal street, N. Y.

STANDARD Photometric Candles.—Owing to a number of Applications made to me for information concerning the supply of the "Standard Sperm Candles," used in Photometrics, I have obtained a supply, from which I can furnish those who require them with full directions for use. T. W. PARMELE,
No. 4 Irving Place, New York.

KEROSENE, Albertine, Coaline, Carbon, Columbian, Empire State, Franklin, Knickerbocker, New York, Paraffine, Vesta, and all other brands of Coal Oil, for Burning and Lubricating purposes.
HORATIO EAGLE, Agt., 254 Canal-st., N. Y.

D. C. GREEN'S PARAFFINE 42½ Gall. Lubricating Oil.—228 Pearl street, New York. Benzole, Crude Coal Oils, Naptha, Burning Coal Oils, Paraffine, Paraffine Candles.

ALBERTINE COAL OIL.—Warranted Pure and superior to any ever before offered for sale in this market; received direct from the New Brunswick Oil Works.
WHITMAN BROS. & CO.,
Agents, 72 Beaver-st., N. Y.

COAL OIL.—10,000 Gallons Celebrated Kerosene Coal Oil, 5,000 Gallons Boston Coal Oil, and other brands, at $1.25 per gallon. STANFORD BROTHERS,
Pacific Oil and Camphene Works, cor. of Front and California streets, San Francisco, Cal.

EMPIRE STATE COAL OIL CO.—Manufacturers of Refined, Bleached, and Deodorized Coal Oil, Factory on Smith street, Brooklyn, L. I.; Store, 240 Pearl street, corner Barling Slip, New York.

CHEMICAL OIL WORKS, Stamford, Conn.—Theodore Ladd. Office 178 Pearl street, New York. Burning and Lubricating Coal Oils, Coalene, Paraffine, Kreosote, Picric Acid, &c.

HENDRICKSON & SHATTUCK, Manufacturers of the Excelsior Lubricating Oil, Philogene and Paraffine Oils; also, Dealers in Sperm, Lard, Whale, Elephant, Tanners', Tallow, Coal, Neatsfoots, Paint and other Oils, Office, No. 21 Cedar street, between William and Pearl streets. D. W. HENDRICKSON,
ALBERT G. SHATTUCK,
New York.

DEPOT AND WAREROOM of the New-York Columbian Oil Company, 44 Courtland street, New York.
G. M. WHEATON, Agent.

NEWTON OIL CO.—Manufacturers and Dealers in Illuminating Coal-Oil, Cordage Oil, Spindle Oil, Rosin Burning Oil, Painters' Oil, Carriers' Oil, Naphtha, Paraffine, Pitch and Tar, Asphaltum Varnish; also, Paraffine Lubricating Oil for Machinery. No. 42 Water street, Boston.

Rosin Oil and Rosin.—For sale of our own manufacture a superior article of ROSIN OIL, for Gas purposes. Also Refined Oil. For shipment in secure iron-bound barrels, or by any single barrel.
Address MARYLAND GAS COMPANY, No. 6 Bank of Baltimore Building, Baltimore, Md.
P. S. This Company is also prepared to construct their superior Patented GAS WORKS of any capacity, from that required for a private dwelling, hotel, church, college or factory, to such as will supply cities and towns, complete in all their parts for the manufacture of GAS, from either Rosin Oil, Coal, or Rosin.

FRANKLIN COAL OIL WORKS.—Robert A. Chesebrough & Co., Depot, 112 John street, New York. Works on Red Hook, Brooklyn, Manufacturers of Paraffine, Benzole, Naptha, Distilled Crude Oil, Axle Grease, Pitch, Illuminating, Lubricating, Binnacle and Head Light Coal Oils. Also, Agents for the Aladdin Coal Oil Works, Pittsburgh. Coal Oil Lamps of all kinds, at the lowest prices.

J. L. McREA, Dealer in Coal Oils and Lamps, Binnacle and Signal Light Oils, 139 Water street, New York.

DANIEL WADSWORTH & CO., Coal Oil Manufacturers, Wholesale Dealers in Oils and Naval Stores, and Commission Merchants.
DANIEL WADSWORTH,
DECIUS WADSWORTH,
207 Pearl street, New York.

MARSH'S PATENT ROSIN or Sun-Light Gas-Works, for Private Dwellings, Hotels, Factories, Railway stations, Sugar-Houses, Towns, &c. By the peculiar construction of the Retorts, the largest amount of decomposing surface is obtained in the smallest space. 2d. Gas is manufactured from crude rosin, without the least deposit of carbonaceous matter in the retorts or pipes; thus enabling them to be operated continuously, generating rapidly the best and cheapest illuminating gas obtained from this material. ALFRED MARSH & CO.,
241 Broadway, New York.

ORION COAL OIL WORKS—Office, 116 Maiden Lane, New York.—Illuminating, Crude and Lubricating Oils, Paraffine, Naptha and Paraffine Candles; constantly on hand an assortment of Coal Oil Lamps.
Agent for STODDARD'S ONE AND TWO-HORSE MOWING MACHINE. Office 116 Maiden Lane, New York.
WILLET HICKS, Agent.

FRANKLIN COAL OIL WORKS—Paraffine, Benzole, Naptha, Distilled Crude Oil, Axle Grease, Pitch.
ROBERT A. CHESEBROUGH,
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